



Course Description

Pre-Calculus I is a study of those topics on algebra which are essential in calculus. Topics included are functions, graphs of functions, linear, quadratic polynomial, rational, exponential and logarithmic functions, conic sections, sequences, and the binomial theorem.

Illinois Articulation Initiative (IAI) number: N/A

Credit and Contact Hours:

Lecture	4
Lab	0
Credit Hours	4

Prerequisites: Appropriate placement score or minimum grade “C” in MATH 095 and MATH 098 or equivalent.

Books, Supplies, and Supplementary Materials

A. **Required Textbooks**

MyMathLab Direct Digital Access. The eText is included in MyMathLab so if you are comfortable reading the textbook on the computer, you may use the eText alone. **There is no need to purchase a physical textbook for this course; the direct digital access fee for the eText was included in your course fees. Registration instructions are posted in our iCampus/Canvas site.**

B. **Other Required Materials**

TI-83+ or TI-84+ graphing calculator

C. **Methods of Instruction:**

Lecture, Hybrid, or Online

General Education Student Learning Outcome

1. Quantitative Literacy: Students possess the ability to reason and solve quantitative problems from an array of contexts.

Course Learning Outcomes (CLOs)

1. Explore characteristics of functions.
2. Graph functions from the various function families.
3. Analyze equations and inequalities in problem-solving situation.
4. Analyze and apply characteristics of conics.
5. Analyze basic properties of arithmetic and geometric sequences and geometric

Lesson Learning Outcomes (LLOs)

1. Find the distance between two points.
2. Find the midpoint of a line segment.
3. Graph relations on a calculator using appropriate window settings.
4. Determine symmetries of graphs.
5. Find intercepts of graphs.
6. Find the standard form for the equation of a given circle.
7. (optional) Use the graphing calculator to draw scatter diagrams, find equation of least squares regression line, find the correlation coefficient, and interpret these results.
8. Work applied variation (proportionality) problems.
9. Determine whether two lines are parallel or perpendicular.
10. Use function notation.
11. Determine the domain of a given function.
12. Recognize graphs of prototypical functions
13. Use the calculator to determine intervals on which a function is increasing or decreasing.
14. Find the slope of a secant line to a graph by writing and reducing the difference quotient.
15. Recognize the graph of a function, which was obtained from that of a prototypical function by shifting, stretching, or reflection.
16. Find the sum, product, difference, quotient, and composition of two functions.
17. Determine whether a given function is one-to-one, and if so, determine its inverse.
18. Graph the inverse of a relation, given the graph of the relation.
19. Construct a function to model an applied optimization problem and use the graphing calculator to solve it.
20. State the Intermediate Value Theorem and use it to show the existence of a zero of a function on a given interval.
21. Solve quadratic equations graphically and algebraically.
22. Solve literal equations.
23. Solve applied problems using an equation in one variable.
24. Perform computations with complex numbers.
25. Solve polynomial and rational inequalities (algebraically and graphically).
26. Solve absolute value equations and inequalities (algebraically and graphically).
27. Find intercepts and vertex of the graph of a quadratic function.
28. Recognize the graph of a polynomial function given its zeroes with their multiplicities.
29. Find intercepts and equations of asymptotes to the graph of a rational function.
30. Determine a possible formula for a rational function given its graph.
31. Factor a polynomial given its zeroes.
32. List the possible rational zeroes of a polynomial function using the Rational Zero Theorem.
33. Recognize irrational zeroes (which the calculator approximates) of a polynomial.
34. Use the complex conjugate pairs theorem to find zeroes of a polynomial function with real coefficients.
35. Use synthetic division to find zeroes of a polynomial and factor it.
36. Define “exponential function.”
37. Define e .
38. Graph exponential functions using transformations.
39. Define “logarithmic function.”
40. Convert between log and exponential expressions.
41. Find domains and ranges of log and exponential functions.
42. Find the asymptotes of log and exponential functions.
43. Graph transformed logarithmic functions.
44. Use properties of logarithms to write equivalent expressions and solve equations.
45. Work applied problems involving exponential growth and decay.
46. (optional) Use the graphing calculator to determine the best fitting log and exponential functions to a set of data points, and determine which is most appropriate.
47. Define parabola using directrix and focus.

48. Define ellipse and hyperbola using foci.
49. Find an equation for a conic section given foci, vertices, asymptotes, etc. (graphically or numerically presented).
50. Given an equation of a conic section determine foci, vertices, asymptotes, and eccentricity as appropriate.
51. Find terms of a sequence, including those defined recursively. Use appropriate notation.
52. Recognize when a sequence is arithmetic or geometric.
53. Find terms and finite sums of arithmetic and geometric sequences.
54. Use mathematical induction to prove statements about sums of sequences and about divisibility.
55. Expand powers of binomials using the Binomial Theorem.

Final Course Grading Scale

Grade	Percentage
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	lower than 60%

Faculty Commitment

Faculty members are committed to providing a quality learning experience through thoughtful planning, implementation, and assessment of course activities. They are also committed to being readily available to students throughout the semester by returning e-mails and phone calls within 48 hours and to returning graded course work within a week. Furthermore, they are committed to selecting appropriate course materials and making them available in an organized and timely manner.

Student Commitment

For every credit hour a student is enrolled in, they should expect to spend at least 2 hours outside of class studying, working on assignments, and preparing for class each week of the fifteen-week semester. For example, for this four credit-hour class, students can expect to spend four hours per week in class actively engaged in learning the material by participating in face-to-face classes or viewing lectures and instructional material online. In addition, students should expect to spend another eight hours per week outside of class completing homework and assignments, posting to discussion boards online, or studying for quizzes and tests. This means students should spend a minimum of 12 hours per week engaged in achieving the learning outcomes for this course. If you are not achieving your desired results in this class, you should consider increasing your prep time outside of class, in addition to using available resources such as instructor office hours and tutoring services.

By registering for this course, you commit yourself to active participation in course activities as well as the submission of all assignments and exams on time. Furthermore, you commit to accessing the course site and checking your JJC e-mail several times a week.