

## **MATH 120 Fundamentals of College Mathematics**

Textbook: *Thinking Mathematically*, 7<sup>th</sup>ed, Blitzer

Coverage: Chapters 2, 3, 8, 10, 11, and 12

Upon completion of MATH 120, students should be able to:

1. Follow appropriate mathematical format and use proper mathematical notation in solving problems.
2. Use mathematical formulas to evaluate problems involving financial data.
3. Calculate perimeter, area, surface area, and volume of various geometric objects.
4. Solve problems using basic set theory.
5. Solve problems using the basic rules of probability.
6. Identify and analyze statistical data.
7. Use formal and symbolic logic to analyze arguments and draw valid conclusions.
8. Use trigonometry to solve problems involving right triangles.
9. Solve problems using dimensional analysis.

## **MATH 126 Precalculus I**

Textbook: *Precalculus*, 6<sup>th</sup> ed., Lial, Hornsby Schneider, Daniels

Coverage: 1.1, 1.3, 1.4, 1.7, 1.8, Chapter 2, Chapter 3 (omit 3.6), Chapter 4, 9.1, 9.3, 9.5, 9.7

Upon completion of MATH 126, students should be able to:

1. Solve a variety of equations including polynomial, exponential and logarithmic.
2. Operate on functions, including basic mathematical operations, composition and inversion.
3. Use the properties of logarithms.
4. Analyze functions by finding roots, turning points, and asymptotes.
5. Manipulate complex numbers and understand their relationship to the solutions of polynomial and rational equations.
6. Solve nonlinear inequalities.
7. Solve systems of equations using various methods including elimination and determinants.
8. Graph a variety of functions including logarithmic, polynomial, rational, and exponential functions.
9. Perform basic operations on matrices including addition, subtraction, and multiplication.
10. Identify, obtain, and graph the equations of circles and parabolas.
11. Demonstrate the appropriate mathematical format and notation in solving problems.
12. Use mathematical functions to model real-world phenomena.

## **MATH 126E Precalculus I Expanded**

Textbook: *Precalculus*, 6<sup>th</sup> ed., Lial, Hornsby Schneider, Daniels

Coverage: 1.1, 1.3, 1.4, 1.7, 1.8, Chapter 2, Chapter 3 (omit 3.6), Chapter 4, 9.1, 9.3, 9.5, 9.7, and additional review materials from algebra which may include operations with radicals, polynomials, and rational expressions, and other topics at the instructor's discretion.

Same learning outcomes as MATH 126.

## **MATH 127 Precalculus II**

Textbook: *Precalculus*, 6<sup>th</sup> ed., Lial, Hornsby Schneider, Daniels

Coverage: Chapter 5, Chapter 6 (omit 6.7), Chapter 7, Chapter 8 (omit 8.6), Chapter 10, 11.1 – 11.5

Upon completion of MATH 127, the student should be able to:

1. Compute values of the six trigonometric functions and their inverses
2. Analyze and draw the graphs of the six trigonometric functions and their inverses.
3. Solve equations involving trigonometric functions and their inverses.
4. Solve right and oblique triangles.
5. Perform operations with vectors and use vectors to solve real-world problems.
6. Express complex numbers in trigonometric form and perform operations with them.
7. Analyze and draw the graphs of parametric and polar equations and convert between Cartesian and polar coordinates.
8. Analyze and graph equations representing conic sections.
9. Describe and define arithmetic and geometric sequences and series and make effective use of sigma notation
10. Correctly use the Principle of Mathematical Induction and the Binomial Theorem.

## **MATH 128 Precalculus and Trigonometry**

Textbook: Same as MATH 126 and MATH 127

Coverage: Combined coverage from MATH 126 and MATH 127

Combined learning outcomes of MATH 126 and MATH 127

## **MATH 181 Calculus I**

Textbook: *Calculus Early Transcendentals*, 14<sup>th</sup> ed, Thomas

Coverage: Chapter 2, Chapter 3 (omit 3.11), Chapter 4 (omit 4.7), Chapter 5, 6.1 – 6.4

Upon completion of MATH 181, the student should be able to:

1. Express algebraically, graphically, and numerically the concept of a continuous function.
2. Demonstrate an understanding of the concepts and terminology of limits through applications and examples.
3. Compute the derivative of a continuous function using the definition, rules of differentiation, slopes of tangent lines, and describe it as a rate of change in a number of natural and physical phenomena.
4. Apply basic applications of beginning calculus including but not limited to optimization, related rates, work, areas, and distances.
5. Compute basic integrals using Riemann sums as well as the Fundamental Theorem of Calculus.
6. Express algebraically, graphically, and numerically the separate concepts of definite and indefinite integration and their connection to differentiation.

## **MATH 182 Calculus II**

Textbook: *Calculus Early Transcendentals*, 14<sup>th</sup> ed, Thomas

Coverage: Chapter 7 omit 7.3, Chapter 8 (omit 8.6, 8.7, 8.9), 9.2 – 9.3, Chapter 10, 11.1 – 11.6

Upon completion of MATH 182, students should be able to:

1. Evaluate integrals involving logarithmic, exponential, and trigonometric functions.
2. Use various techniques to evaluate integrals, including by parts, partial fraction decomposition, and trigonometric substitution.
3. Solve first-order linear differential equations.
4. Determine the convergence of infinite sequences and series.
5. Represent functions as power series.
6. Find area, areas of surfaces of revolution, length, and derivatives of parametric curves.
7. Find area and lengths in polar coordinates.

## **MATH 283 Calculus III**

Textbook: *Calculus Early Transcendentals*, 14<sup>th</sup> ed, Thomas

Coverage: Chapters 12 – 16

Upon completion of MATH 283, students should be able to:

## STAT 152 Statistics

Textbook: *Introductory Statistics*, 10<sup>th</sup> ed., Weiss

Coverage: Chapters 1 – 2, Chapter 3 (omit 3.5), Chapter 4, Chapter 5 (omit 5.4), Chapter 6 (omit 6.5), Chapters 7 - 8, Chapter 9 (omit 9.6, 9.7), Chapter 10 (omit 10.6, 10.7), Chapter 12 **NOTE: After Chapter 12, there was variation in the amount of material covered. This needs to be clarified.**

Upon completion of STAT 152, students should be able to:

1. Select and produce appropriate graphical, tabular, and numerical summaries of the distributions of variables in a data set. Summarize such information into verbal and numeric descriptions.
2. Summarize relationships in bivariate data using graphical, tabular, and numerical methods including scatter plots, box plots, two-way tables, correlation coefficients, and linear regression.
3. Use the normal distribution to interpret z-scores and compute probabilities.
4. Construct a model for a random phenomenon using outcomes, events, and the assignment of probabilities.
5. Apply the concept of a sampling distribution and discuss the distribution of the sample proportion under repeated sampling (Central Limit Theorem).
6. Understand the dependence of margin of error on sample size and confidence level.
7. Apply methods of hypothesis testing to carry out a hypothesis about population means and population proportions and interpret the conclusion.