

Mathematics 1325 – Business Calculus and Finite Mathematics II

Student Learning Outcomes

1. **The students will demonstrate factual knowledge including the mathematical notation and terminology used in this course.** Students will read, interpret, and use the vocabulary, symbolism, and basic definitions used in Business Calculus and Finite Mathematics II including set theory, counting techniques, probability, statistics, derivatives and integration.
2. **The students will describe the fundamental principles arising from the mathematical ideas associated to business applications.** Students will identify and apply the laws and formulas that result directly from the definitions; for example, the properties associated with probability models and probability experiments as well as the relationships between probability and statistics; normal probability distributions; the formulas and concepts underlying descriptive statistics; limits, derivatives and integrals.
3. **The students will apply the course material along with techniques and procedures covered in this course to solve business related problems.** Students will use the facts, formulas, and the techniques learned in this course to solve basic business problems. For example, students will be able to use the facts, formulas and techniques learned in this course to analyze data in various ways; apply probability models to business problems; maximize and minimize profit and loss respectively using derivatives; explore the relationships between integration and probability; use normal curves to answer statistical questions; use the formulas for mean, median, mode, range and sample standard deviation to analyze data sets.
4. **The students will develop specific skills, competencies, and thought processes sufficient to support further study or work in this field or related fields.** Students will acquire a level of proficiency in the fundamental concepts and applications necessary for business statistics as well as well as other areas requiring Business Calculus and Finite Mathematics II as a prerequisite. These areas might include business, marketing, finance, computer science, nursing, and the social sciences, as well as mathematics.

Course Content

Textbook: *Mathematical Applications, 11th edition*, by Harshbarger and Reynolds. The following chapters including the particular sections listed are covered.

0. **Sets:** Unions, intersections, complements, universal set.
7. **Introduction to Probability:** Probability; odds; union and intersection of events; conditional probability; probability trees; counting: permutations and combinations; permutations, combinations and probability.
8. **Further Topics in Probability; Data Description:** Binomial probability; data description; discrete probability distributions; binomial distribution; normal probability distribution; normal curve approximation to the binomial distribution.
9. **Derivatives:** Limits; continuous functions; limits at infinity; the derivative; derivative formulas; product rule and quotient rule; chain rule and power rule; using derivative formulas; higher-order derivatives; applications of the derivative in business and economics.
10. **Applications of Derivatives:** Maxima and minima; curve sketching; concavity: points of inflection; optimization in business and economics; applications of maxima and minima.

- 11. Derivatives Continued:** Derivatives of the natural logarithmic functions; derivatives of base e exponential functions.
- 12. Indefinite Integrals:** Indefinite integral; power rule; integrals involving logarithmic and exponential functions.
- 13. Definite Integrals:** Area under a curve; definite integral: the fundamental theorem of calculus.