

### **MATH 251 Discrete Math**

Upon completion of the course, the student will be able to:

1. Explain the propositional calculus of logic.
2. Prove problems regarding elementary number theory.
3. Explain sequences and mathematical induction.
4. Explain properties of sets and relations on sets of equivalence.
5. Apply the concepts of functions and evaluate cardinality.
6. Evaluate elementary combinatorics.
7. Explain the properties of graphs and trees.

### **MATH 285, Differential Equations Learning Outcomes**

Upon completion of the course, the student will be able to:

1. Solve simple first order differential equations.
2. Set up and solve first order physical systems.
3. Solve simple second order differential equations.
4. Set up and solve second order physical systems.
5. Determine the Laplace transform of functions.
6. Solve linear second order DE's using Laplace transforms.
7. Solve DE's using series expansion techniques.
8. Solve first or second order boundary value problems.

### **MATH 314, History of Mathematics**

Upon completion of the course, the student will be able to:

1. Demonstrate familiarity with numeration systems, computation, and geometry in ancient civilizations.
2. Present and defend mathematical ideas in the manner of a clear, concise, well-supported mathematical proof.
3. Solve various mathematical problems of historical significance.
4. Demonstrate and understanding of historical approaches to mathematical thought.

### **MATH 330 Linear Algebra**

Upon completion of the course, the student will be able to:

1. Solve systems of linear equations using elementary row operations, find determinants of matrices, and perform matrix algebra
2. Compute the dimension of a vector space, the rank of a matrix or span of a collection of vectors and carry out a change of basis.
3. Compute eigenvalues and eigenvectors; determine whether a matrix is diagonalizable and if possible diagonalizable it.
4. Identify a basis for a vector space, use the Gram-Schmidt process to find an orthonormal basis.

### **MATH 331, Groups, Rings, and Fields**

Upon the completion of the course, the student will be able to:

1. Demonstrate an understanding of structures associated with basic groups, subgroups, cyclic groups, and generating sets.
2. Demonstrate an understanding of structures associated with permutation groups, alternating groups, cosets, direct products, and Abelian groups.
3. Demonstrate an understanding of homomorphisms, factor groups, and simple groups.
4. Demonstrate an understanding of rings, fields, integral domains, and applications to polynomials.
5. Demonstrate an understanding of ideals and factor rings.
6. Demonstrate an understanding of various types of extension field.
7. Present ideas in the manner of a clear, concise mathematical proof where all critical statements are correctly supported by theorems.