VIRGINIA BEACH CITY PUBLIC SCHOOLS
CHARTING THE COURSE

Department of Teaching & Learning
Parent/Student Course Information

DISCRETE MATHEMATICS
(MA 3125)
One half-credit, One semester
Grades 11-12

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION
Discrete Mathematics offers methods of problem solving which are not normally found in the algebra, geometry, trigonometry or mathematical analysis courses. Problems in the area of management science such as modeling problems with graphs, scheduling, designing efficient delivery routes and optimization are emphasized along with social decision-making topics including fair division.

PREREQUISITE
Algebra II or Algebra II/Trigonometry

OPTIONS FOR NEXT COURSE
Trigonometry and/or Probability and Statistics

REQUIRED TEXTBOOK
Excursions in Modern Mathematics, Eighth Edition, Tannenbaurm, Pearson Education (2014)

RECOMMENDED CALCULATOR
TI-83 Plus, TI-84 Plus, TI-84 Plus C or TI-84 Plus CE

Virginia Beach Instructional Objectives
Discrete Mathematics (1 Semester) – MA3125

VBO#	Objective
	Election Theory and Weighted Voting
MA.D.1.1	The student will determine group rankings through a variety of election methods, including plurality, majority, Borda, runoff, sequential runoff, Condorcet and approval. The student will be able to analyze the advantages and disadvantages of each method in a given situation and identify flaws in group-ranking methods. **(SOL DM.8)**
MA.D.1.2	The student will investigate and describe weighted voting methods. **(SOL DM.8)**
	Fair Division and Apportionment
MA.D.2.1	The student will select, apply and justify a method of fair division such as divide and choose, lone divider, marker or last diminisher. The student will compare and contrast the continuous and the discrete cases of fair division. **(SOL DM.7)**
MA.D.2.2	The student will apply apportionment methods to allocation decisions. The students will be able to compare, contrast and identify flaws in apportionment methods, including Hamilton, Webster, Jefferson, Adams and Hill-Huntington. **(SOL DM.9)**
	Graph Theory
MA.D.3.1	The student will construct a vertex-edge graph to model a problem and be able to determine connectedness, planarity and valences of a graph. The student will be able to model a problem with a directed graph, determine isomorphism given two or more graphs and create an adjacency matrix for a graph. **(SOL DM.1)**
MA.D.3.2	The student will solve problems through investigation and application of circuits, cycles, Euler Paths, Euler Circuits, Hamilton Paths and Hamilton Circuits. Students will use existing algorithms and student-created algorithms. **(SOL DM.2)**
MA.D.3.3	The student will be able to apply vertex-edge graphs to conflict-resolutions problems, such as map coloring, scheduling, matching and optimization, using graph coloring and chromatic numbers. **(SOL DM.3)**
MA.D.3.4	The student will create matrices to represent a situation, perform matrix operations using a graphing calculator and apply matrices to problem solving. **(SOL DM.1)**
	Optimization
MA.D.4.1	The student will apply vertex-edge graphs to problem solving using algorithms such as Kruskal's, Prim's or Dijkstra's, relating trees, networks and paths, in order to determine the number of possible solutions and generate solutions when a feasible number exists. **(SOL DM.4)**
MA.D.4.2	The student will determine minimum project time, be able to construct an order-requirement digraph to model a given situation and determine the critical path(s) in a given graph. The student will be able to use the list-processing algorithm and determine if the result is optimum and be able to compare and contrast student-created algorithms with the list-processing algorithm. **(SOL DM.5)**
MA.D.4.3	The student will apply linear programming to problem solving. This includes: determining the constraints (inequalities) for a given problem; being able to graph the system of constraints using a graphing calculator; determining the corner points of the feasible region and finding the optimal solution; and applying the Simplex Method of problems with more than two variables. **(SOL DM.6)**

Dr. Aaron C. Spence, Superintendent
Virginia Beach City Public Schools
2512 George Mason Drive, Virginia Beach, VA 23456-0038

Produced by the Department of Media and Communications for the Department of Teaching and Learning.
For further information please call (757) 263-1070.

Notice of Non-Discrimination Policy

Virginia Beach City Public Schools does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation/gender identity, pregnancy, childbirth or related medical condition, disability, marital status, age, genetic information or veteran status in its programs and activities and provides equal access to the Boy Scouts and other designated youth groups. School Board policies and regulations (including, but not limited to, Policies 2-33, 4-4, 4-6, 4-43, 5-7, 5-19, 5-20, 5-44, 6-7, 7-48, 7-49, 7-57 and Regulations 4-4.1, 4-4.2, 4-6.1, 4-43.1, 5-44.1, 7-11.1, 7-17.1 and 7-57.1) provide equal access to courses, programs, counseling services, physical education and athletic, vocational education, instructional materials and extracurricular activities.

To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title VI/Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia, 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia, 23456 (for employees or other citizens). Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/Executive Director of Student Support Services at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Laskin Road Annex, 1413 Laskin Road, Virginia Beach, Virginia, 23451.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write The Department of Teaching and Learning, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone 263-1070 (voice); fax 263-1424; 263-1240 (TDD) or email him at Emmanuel.Cenizal@VBSchools.com

vbschools.com
your virtual link to Hampton Roads' largest school system

VIRGINIA BEACH CITY PUBLIC SCHOOLS
CHARTING THE COURSE

(Revised August 2017)