Course Syllabus

FINITE MATHEMATICS (Math 124)

Description: *A course for students with a good foundation in mathematics who are interested in mathematical models for the life, management or social sciences. Topics include matrix algebra, linear programming, probability, counting methods, Markov chains, and game theory.*

Credit Hours: 4

Audience: Fulfills the Quantitative Analysis component of the General Education Requirements for both the Bachelor of Arts and Bachelor of Science degree. Required for Business majors (and pre-requisite for BUS 305, IDS 205).

Corequisite: Concurrent enrollment in Math 111 or placement higher than Math 111 in the Math Placement process.

Format: 4 lectures (50 min) per week

Textbook: *Applied Finite Mathematics, 3rd Edition* by Rupinder Sekhon, revised by Roberta Bloom. (https://www.deanza.edu/faculty/bloomroberta/math11/)

Technology: You may find a scientific calculator useful for this course, but it is not required. Very often calculator use on tests and the final exam will be restricted to a calculator provided by the department. Homework for this course is through the online system WeBWork. There is a $25 fee for WeBWork in lieu of a textbook fee for the course.

Disability Support: The Access & Accommodation Resource Center (AARC) is the campus office that works with students to provide access and accommodations in cases of diagnosed mental or emotional health issues, attentional or learning disabilities, vision or hear limitations, chronic diseases, or allergies. You can contact the office at aarc@valpo.edu or 219.464.5206. Students who need, or think they may need, accommodations due to a diagnosis, or who think they may have a diagnosis, are invited to contact AARC to arrange a confidential discussion with the AARC office. Further, students who are registered with AARC are required to contact their professor(s) if they wish to exercise the accommodations outlined in their letter from the AARC.

Internet: Course material and grades are often maintained in Blackboard, at the discretion of the instructor.

Emergencies: VU's Emergency Notification System (ENS) uses multiple forms of communication, including e-mail, building alarms, outdoor sirens, message boards, computer alerts, Twitter, and public address messaging. Please review the specific procedures for this class found in Blackboard. Remember: "Siren inside, GO outside; Siren outside, GO inside." To evacuate, gather your personal belongings quickly and proceed to the nearest exit. Do not use the elevator. To shelter in place, move away from the windows and stay low to the ground; lock or barricade the door if there is a threat of violence.

Notice of Cancellation	Notifications of class cancellations will be made through Blackboard with as much advance notice as possible. It will be both posted on Blackboard and sent to your Valpo e-mail address. .

Student Learning Objectives:

A. Students develop and improve analytical thinking for problem solving, especially recognizing quantitative information/data within a problem statement (where the problem domain exists within a finite setting).
B. Students build mathematical models to represent the quantitative information.
C. Students apply mathematical tools, based on the model built, to provide a solution or solutions to the problem.
D. Students understand which, if any, solution makes sense relative to the problem statement.
E. Students become quantitatively literate citizens, meaning they have a competency and comfort in working with numerical/mathematical data.

Topics & Performance Requirements Include (but are not limited to):

1. develop a linear model (A, B)
2. develop a model of a linear system (A, B)
3. graph lines, inequalities, and the solution set for a system of inequalities (A,B)
4. perform matrix arithmetic and determine the inverse of a matrix (C)
5. solve linear equations and systems of linear equations using Gaussian elimination (C)
6. develop a model for simple linear optimization problems (A, B)
7. solve linear programming problems, graphically and via the Simplex Method (C, D)
8. analyze final simplex tableaus for linear optimization problems (D)
9. use correctly the addition and multiplication counting principles (C, D)
10. solve standard probability problems which make use of the counting principles (C, D)
11. identify and compute probabilities for mutually exclusive or independent events (B,C)
12. solve standard probability problems involving inclusion / exclusion, conditional probabilities, Bayes Theorem (B, C)
13. develop probabilistic models for stochastic processes (A, B)
14. develop models for Markov processes (A, B)
15. analyze transition matrices to determine expected time to absorption and probabilities of absorption in a Markov process (C,D)
16. develop models for *n x m* 2-person zero-sum games (A, B)
17. analyze payoff matrices to determine optimal strategies in 2-person zero-sum games (C,D)

General Themes:

18. identify which rules, formulas, or theorems can be applied to a problem (C, D)
19. recognize when results/solutions are false (D, E)
20. use proper mathematical notation and vocabulary (E)
21. write clear and detailed solutions to assigned problems (C, E)