*Approved: April 8, 2022 Effective: Fall 2023*

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| **MATERIAL TO BE COVERED** | **SECTIONS FROM TEXT** | **RECOMMENDED TIME LINE** |
| **Math 120 Topics: Linear Functions**  Rectangular coordinate system, graphs of lines, equations of a line, function notation, supply and demand, break-even analysis  **Math 12 Support Topics:** Order of operations, evaluating expressions, solving linear equations with fractions, solving formulas for a specified variable, intercepts, slope, parallel and perpendicular lines. Additional time with functions, function notation, and linear models. | 1.1 – 1.2 | **Math 120:**  2 hours  **Math 12:**  4 hours |
| **Math 120 Topics: Systems of Linear Equations and Matrices**  Solving systems of linear equations in two and three variables using the echelon method, Gauss-Jordan method. Solving systems of m linear equations containing n variables. Matrix algebra, multiplication of matrices, matrix inverses.  Models: business and economic, life science, social science models.  **Math 12 Support Topics:** Operations with fractions. Additional time with Gauss-Jordan, matrix multiplication, matrix inverses, and models involving business and economics, life and health sciences, physical sciences. | 2.1 - 2.5 | **Math 120:**  6 hours  **Math 12:**  3 hours |
| **Math 120 Topics: Linear Programming (The Graphical Method)**  Graphing linear inequalities, geometric approach to linear programming. Models: investment, manufacturing, cost.  **Math 12 Support Topics:** Translating phrases into equations and inequalities,  graphs of lines. Additional time with linear programming applications. | 3.1 - 3.3 | **Math 120:**  3 hours  **Math 12:**  3 hours |
| **Math 120 Topics: Linear Programming (The Simplex Method)**  Simplex method, pivoting, solving, maximization in standard form, minimizing using the Duality Principle. Simplex with mixed constraints.  Models: profit, mixture, and investment.  **Math 12 Support Topics:** Writing an augmented matrix for a system, translating phrases into equations and inequalities. Additional time with the Duality Principle, maximization, minimization, and nonstandard problems. | 4.1 - 4.4 | **Math 120:**  6.5 hours  **Math 12:**  3 hour |
| **Math 120 Topics: Mathematics of Finance**  Simple interest, compound interest, present and future value annuities.  Models: loans, investment, mortgage.  **Math 12 Support Topics:** Calculator support, converting between fractions, decimals, and percents, evaluating formulas for given values, using exponent rules to simplify expressions. Additional time with models involving loans, investment, and mortgage. | 5.1 – 5.3 | **Math 120:**  3.5 hours  **Math 10A:**  3 hours |
| **Math 120 Topics: Sets and Probability**  Set theory, Venn diagrams, sample space, probability of an event, odds, conditional probability, independent events, product rule of probability, Bayes’ Theorem.  **Math 12 Support Topics:** Symbols, vocabulary and terminology, set operations (including unions, intersections, complements), calculator support, concepts and properties of probability. Additional time with conditional probability and Bayes’ Theorem.  Additional time with applications of Venn diagrams (surveys and data analysis). | 7.1 – 7.6 | **Math 120:**  6 hours  **Math 12:**  4 hours |
| **Math 120 Topics: Counting Principles**  Combinatorics and counting techniques, multiplication principle, binomial probability distribution, expected value.  **Math 12 Support Topics:** Calculator support, tree diagrams, counting by systematic listing, permutations and combinations, Pascal's triangle, counting problems involving "not" and "or". Additional time with permutations, combinations, probability distribution, and expected value. | 8.1 – 8.5 | **Math 120:**  5 hours  **Math 12:**  4 hours |
| **Math 120 Topics: Statistics**  Data and sampling, organizing and displaying data, measure of central tendency, measures of variation, the normal distribution, normal approximation to the binomial distribution.  **Math 12 Support Topics:** Basic statistical concepts, calculator support, frequency distributions, visual displays of data, standard deviation, z-score, binomial distribution, and the normal distribution. Additional time with interpreting results, discrete and continuous random variables, the Normal Distribution. | 9.1 – 9.4 | **Math 120:**  5 hours  **Math 12:**  4 hours |
| **Math 120 Topics: Markov Chains**  Markov chains and transition matrices.    **Math 12 Support Topics:** Tree diagrams, probability, solving systems of linear equations, matrix multiplication, Gauss-Jordan, row vectors, equilibrium vector. Additional time with properties of Markov Chains. | 10.1 – 10.2 | **Math 120:**  2.5 hours  **Math 12:**  2 hours |

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**Math 12 Instructor Notes:**

* This outline does not include time for Math 12 exams. Exams in support courses are at the discretion of the professor.
* Corequisites are 15-week course and do not meet during finals week.
* Final exam should be given during week 15.
* Pearson MyLab is available as an instructor resource and student resource.
* Corequisite courses are Pass/No Pass grading and are not subject to department grading policy.
* Math Department Policy can be found at: <https://mtsac.instructure.com/courses/33990/files?preview=1988385>

Submitted by: Khoddam, Kim, Kirchgraber, Kojima, Sun, Takashima (chair), Tran