David Shuster: Math & Related Coursework

Note: All courses were taken at Amherst College.

| Title | Number | Description | Textbook | Grade |
|---|---|---|---|---|
| Multivariable Calculus | MATH-211 | | | A |
| Linear Algebra | MATH-271 | vector spaces, subspaces, linear independence, basis, and dimension; systems of linear equations and Gaussian elimination, matrix operations; linear transformations as matrices; eigenvalues and eigenvectors; inner product spaces | | A |
| Intro Computer Science I | COSC-111 | | | A |
| Groups, Rings and Fields | MATH-350 | theory of groups and rings including the principal theorems on homomorphisms and the related quotient structures; integral domains, fields, polynomial rings | Abstract Algebra: A First Course (Dan Saracino), 2nd ed. | A |
| Intro to Stat Modeling | MATH-135 | | | A+ |
| Intro to Analysis | MATH-355 | Completeness of the real numbers; convergence, bounded monotone sequences, Cauchy sequences, Bolzano-Weierstrass Theorem; countability, open and closed sets, compactness, Heine-Borel Theorem; Functions and continuity, Intermediate Value Theorem, continuous functions on a compact set, uniform continuity; Derivatives, Rolle's Theorem and Mean Value Theorem; Riemann integration; Uniform convergence of sequences and series of functions, continuity of the limit, derivatives and integrals of series, Weierstrass M-Test, power series | Understanding Analysis (Stephen Abbott), 2nd ed. | A+ |
| Mathematical Logic | MATH-385 | first-order languages, formal deductive systems; Completeness Theorem for first-order logic; Gödel Numbering and Incompleteness; Peano Arithmetic and the Second Incompleteness Theorem | A Friendly Introduction to Mathematical Logic (Leary & Kristiansen) | A+ |
| Intro Comp Science II | COSC-112 | data abstraction, inheritance, and polymorphism; stacks, queues, linked lists, programming for graphical user interfaces, and basic topics in probability | | A+ |
| Mathematics of Public-Key Cryptography | MATH-252 | Several topics from number theory, abstract algebra, and algorithms, including discrete logarithms, integer factorization algorithms, and elliptic curves | An Introduction to Mathematical Cryptography | A+ |

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| Game Theory & Applicatn | ECON-420 | applications-focused upper-level Economics Department course: Nash equilibrium, Stackelberg equilibrium, repeated games, evolutionary game theory, moral hazard, adverse selection, incomplete information and signaling, signaling with continuous actions | Game Theory: An Introduction (Steven Tadelis) | A |
| Voting and Elections: A Mathematical Perspective | MATH-150 | majority rule, plurality rule, Borda count, and approval voting; Banzhaf power index; Arrow's Theorem | The Mathematics of Voting and Elections: A Hands-On Approach (Hodge, Klima) & 2 other books | A+ |
| Topology | MATH-455 | topological spaces and continuous functions; subspace, quotient and product topologies; connectedness and compactness; separation axioms and metrizability; homotopy and the fundamental group; classification of surfaces | Topology (James Munkres), 2nd ed. | A+ |
| Intermediate Statistics | STAT-230 | parametric and nonparametric methods, resampling approaches, analysis of variance models, multiple regression, model selection, and logistic regression | | A |