

List of Courses Taken

Zane Billings

Updated Fall 2019

Mathematics

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| MATH 153 | Calculus I | Limits, continuity, derivatives and integrals of algebraic and trigonometric functions with applications. |
| MATH 250 | Logic and Proof | Introduction to the principles of logic and methods of proof necessary for successful study of mathematics. |
| MATH 255 | Calculus II | Derivatives and integrals of transcendental functions, techniques of integration, indeterminate forms, improper integrals, and infinite series. |
| MATH 256 | Calculus III | Plane curves, polar coordinates, vectors and solid analytical geometry, vector-valued functions, partial differentiation, and multiple integrals. |
| MATH 270 | Statistical Methods I | Descriptive statistics, probability, random variables, sample distributions, confidence intervals, one-sample and two-sample hypothesis testing, chi-square inference for two-way tables, simple linear regression, multiple linear regression, and ANOVA. |
| MATH 310 | Discrete Structures | Graph theory: planarity, Eulerian and Hamiltonian cycles, colorings and trees. Enumeration: permutations, combinations, binomial distribution, recurrence relations, and inclusion-exclusion. Basic algorithms. |
| MATH 320 | Ordinary Differential Equations | Differential equations of first order, first degree with applications; linear equations of higher order and numerical methods; special equations of second order, systems of linear equations. |
| MATH 340 | Scientific Computing | Survey of mathematical software and programming languages (L ^A T _E X, spreadsheets, Mathematica, and MATLAB); applications in modeling and simulation; development of algorithms requiring advanced mathematical background. |
| MATH 370 | Probability and Statistics I | Classical probability models, distributions of discrete and continuous random variables, joint probability distributions, and mathematical expectation. |
| MATH 375 | Statistical Methods II | Least squares estimates of parameters in regression models, simple and multiple linear regression, hypothesis testing and confidence in linear regression models, testing of models, data analysis and appropriateness of models, time series models, moving average, ARIMA, forecasting with time series models, forecast errors. Includes analysis of real data. |
| MATH 362 | Linear Algebra | Systems of equations, matrices, vector spaces, and linear transformations. |

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| MATH 430 | Mathematical Modeling | Design of models, analysis of stability and sensitivity, optimization, programming models (with Mathematica), forecasting, differential equation models, bifurcations, and controls. |
| MATH 441 | Numerical Analysis | Numerical techniques in root-finding, interpolation, differentiation and integration, ordinary differential equations, linear systems, and error analysis of methods. |
| MATH 450 | Linear Optimization | Formulation and solution of linear programming models; development of simplex method; duality theory; sensitivity analysis; software (spreadsheets and AMPL); and applications. |
| MATH 479 | Capstone Seminar | A course requiring written papers and oral presentations by students on historical and contemporary ideas from the current mathematical literature. |

Biology

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| BIOL 140 | Principles of Biology I | Intro to biology for majors. Basic cell structure and function, bioenergetics, introduction to genetics and molecular biology. |
| BIOL 141 | Principles of Biology II | Second course for biology majors. Comparative introduction to structure, physiology, and evolutionary trends across organisms. |
| BIOL 240 | Genetics | Introduction to principles of genetics, including Mendelian and molecular genetics. Mendelism, linkage, recombination, DNA structure and function, genomics, evolution of development, and molecular evolution. |
| BIOL 304 | General Ecology | Ecosystem and population processes, pathways of energy and materials, interactions between organisms and populations and the human role in the biosphere. Includes discussion of some mathematical models. |
| BIOL 306 | Evolutionary Biology | Population genetic processes, speciation, selection models, phylogeny, reconstruction, and molecular evolution, including historical and analytical approaches. |
| BIOL 333 | Molecular Biology | Genome structure; protein shape, structure, and function; RNA and protein synthesis; control of gene expression and post-transcriptional controls; recombinant DNA technology; membrane structure; protein sorting; cell communication, the cell cycle, and cancer. |
| BIOL 361 | Principles of Biochemistry | Structure and properties of biomolecules; central principles of metabolism. |
| BIOL 412 | Cell and Molecular Immunology | Detailed examination of the immune response, including antigen recognition, effector mechanisms, immunogenetics, immunoregulation, immunity to infection, immunopathology, tumor and transplantation immunology, and autoimmunity. |
| BIOL 419 | Cell Biology | Structure and function of cells, and techniques for studying cells. |
| BIOL 420 | Darwin's Origin of Species | A detailed reading and analysis of Darwin's landmark work, <i>On the Origin of Species</i> . Examining its historical and philosophical context, and its social and scientific significance. |

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| BIOL 493 | Advanced Techniques in Microscopy | In-depth examination of imaging techniques used in biomedical fields, emphasizing fluorescence microscopy. Properties of light, refractive index, fluorescent quantum yield, quenching, polarization, anisotropy, FRET, FRAP, super-resolution, and single molecule techniques. |
| BIOL 493 | Protein Systems Bioinformatics | Relationship between protein structure and function: levels of structure, structural stability; functions of proteins, relationship of structure to function; optimization and regulation of protein functions; scientific literacy. |

Other

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| CIS 293 | Visual Data Storytelling | Concepts of data visualization, effective visualizations, visualizations, dashboards, and stories with Tableau. |
| CS 150 | Programming and Problem Solving | Problem Solving and algorithm development using Python; classes, selection, iteration, arrays, and generic classes. |
| PAR 320 | Philosophy of Lewis and Tolkien | Exploration of the philosophies of C.S. Lewis and J.R.R. Tolkien through in-depth examination of several of their works. Works covered: Mere Christianity, Perelandra, and the Screwtape Letters by Lewis, The Lord of the Rings and short selections by Tolkien. For honors credit: Lewis' The Promise of Pain, Tolkien's The Silmarillion. |
| USI 202 | Peer Tutoring | Theory, practice, and procedures for peer tutors. Tutoring guidelines and responsibilities, communication skills, learning theory, critical thinking, study skills, and professional ethics. |