Course Overview

Mathematics

Math 111: Calculus

- *UW-Madison Equivalent:* MATH 211 - CALCULUS
- *Instructor:* Prof. Angélica Osorno
- *Grade:* B
- *School:* Reed College
- *Text:* Calculus of a Single Variable, 8th Edition, Larson, Hostetler, and Edwards
- *Subject Matter:* Full course for one semester. This includes a treatment of limits, continuity, derivatives, mean value theorem, integration—including the fundamental theorem of calculus, and definitions of the trigonometric, logarithmic, and exponential functions. Prerequisite: three years of high school mathematics. Lecture-conference.

Math 112: Intro to Analysis

- *UW-Madison Equivalent:* MATH/COMP SCI 240 - INTRODUCTION TO DISCRETE MATHEMATICS
- *Instructor:* Prof. Irena Swanson
- *Grade:* B
- *School:* Reed College
- *Text:* Introduction to Analysis, Irena Swanson
- *Subject Matter:* Full course for one semester. Field axioms, the real and complex fields, sequences and series. Complex functions, continuity and differentiation; power series and the complex exponential. Prerequisite: Mathematics 111 or equivalent. Lecture-conference.

Math 121: Introduction to Computing (Now Computer Science 121)

- *UW-Madison Equivalent:* COMP SCI 202 - INTRODUCTION TO COMPUTATION
- *Instructor:* Prof. Jim Fix
- *Grade:* B
- *School:* Reed College
- *Text:* Course Notes, Jim Fix & Composing Programs, John DeNero
- *Subject Matter:* Full course for one semester. An introduction to computer science, covering topics such as elementary data structures, algorithms, computability, floating point computations, and programming in a high-level language. Prerequisite: three years of high school mathematics. Lecture-conference and lab.

Math 141: Intro to Probability & Statistics

- *UW-Madison Equivalent:* STAT 301/303 - INTRODUCTION TO STATISTICAL METHODS/R FOR STATISTICS 1
- *Instructor:* Prof. Albyn Jones
- *Grade:* B
- *School:* Reed College
- *Text:* Probability and Statistics Course Notes, Albyn Jones (Link Not Available)
- *Subject Matter:* Full course for one semester. The basic ideas of probability including properties of expectation, the law of large numbers, and the central limit theorem are discussed. These ideas are applied to the problems of statistical inference, including estimation and hypothesis testing. The linear regression model is introduced, and the problems of statistical inference and model validation are studied in this context. A portion of the course is devoted to statistical computing and graphics. Prerequisite: three years of high school mathematics. Lecture-conference and laboratory.

Math 211: Multivariable Calculus 1

- *UW-Madison Equivalent:* MATH 213/217 - CALCULUS AND INTRODUCTION TO DIFFERENTIAL EQUATIONS/CALCULUS WITH ALGEBRA AND TRIGONOMETRY 2
- *Instructor:* Prof. Thomas Wieting
- *Grade:* B+
- *School:* Reed College
- *Text:* Multivariable Calculus, Jerry Shurman
- *Subject Matter:* Full course for one semester. A development of the basic theorems of multivariable differential calculus, optimization, and Taylor series. Inverse and implicit function theorems may be included. Prerequisite: Mathematics 112 or consent of the instructor. Lecture-conference.

Math 212: Multivariable Calculus 2

- *UW-Madison Equivalent:* MATH 213/221 - CALCULUS AND INTRODUCTION TO DIFFERENTIAL EQUATIONS/CALCULUS AND ANALYTIC GEOMETRY 1
- *Instructor:* Prof. Jerry Shurman
- *Grade:* B
- *School:* Reed College
- *Text:* Multivariable Calculus, Jerry Shurman

- *Subject Matter:* Full course for one semester. A study of line, multiple, and surface integrals, including Green's and Stokes' theorems; linear differential equations. Differential geometry of curves and surfaces or Fourier series may be included. Prerequisite: Mathematics 211 or consent of the instructor. Lecture-conference.

Math 321: Real Analysis

- *UW-Madison Equivalent:* MATH 521/522- ANALYSIS 1/2
- *Instructor:* Prof. Thomas Wieting
- *Grade:* B
- *School:* Reed College
- *Text:* Metric Spaces, Thomas Wieting
- *Subject Matter:* Full course for one semester. A careful study of continuity and convergence in metric spaces. Sequences and series of functions, uniform convergence, normed linear spaces. Prerequisite: Mathematics 202. Lecture-conference.

Math 331: Linear Algebra

- *UW-Madison Equivalent:* MATH 341 - LINEAR ALGEBRA
- *Instructor:* Prof. Angélica Osorno
- *Grade:* B
- *School:* Reed College
- *Text:* Linear Algebra, Fourth Edition, by S. Friedberg, et.al.
- *Subject Matter:* Full course for one semester. A brief introduction to field structures, followed by presentation of the algebraic theory of finite dimensional vector spaces. Topics include linear transformations, determinants, eigenvalues, eigenvectors, diagonalization. Geometry of inner product spaces is examined in the setting of real and complex fields. Prerequisite: Mathematics 112. Lecture-conference.

Math 343: Statistics Practicum (2020 Audit)

- *UW-Madison Equivalent:* STAT 628 - DATA SCIENCE PRACTICUM
- *Instructor:* Prof. Kelly McConville
- *Grade:* N/A (Audit)
- *School:* Reed College
- *Text:* Communicating with Data: The Art of Writing for Data Science, Deborah Nolan and Sara Stoudt (Link Not Available)
- *Subject Matter:* Full course for one semester. In this course, students will participate in a team-based, semester-long research project. Class time will be divided between supervised research time and a seminar focused on providing students with skills to facilitate their research. Seminar topics will include reproducible workflows, effective strategies for collaborative work, technical writing, statistical consulting, and scientific presentations. The course covers several components of the research process, such as literature reviews, technical writing, and scientific presentations. Emphasis is placed on developing a reproducible workflow. Prerequisite: Mathematics 243, or Mathematics 241 with permission of the instructor. Conference-laboratory.

Math 391: Probability

- *UW-Madison Equivalent:* STAT/MATH 733/734 - THEORY OF PROBABILITY 1/2
- *Instructor:* Prof. Thomas Wieting
- *Grade:* B
- *School:* Reed College
- *Text:* Elementary Probability, Thomas Wieting
- *Subject Matter:* Full course for one semester. A development of probability theory in terms of random variables defined on discrete sample spaces. Special topics may include Markov chains, stochastic processes, and measure-theoretic development of probability theory. Prerequisites: Mathematics 113 and 202. Lecture-conference.

Math 392: Mathematical Statistics (2020 Audit)

- *UW-Madison Equivalent:* STAT 609 - MATHEMATICAL STATISTICS 1
- *Instructor:* Prof. Andrew Bray
- *Grade:* N/A (Audit)
- *School:* Reed College
- *Text:* Probability and Statistics, 4th ed., DeGroot and Schervish , Other Texts Detailed on Course Page
- *Subject Matter:* Full course for one semester. Theories of statistical inference, including maximum likelihood estimation and Bayesian inference. Topics may be drawn from the following: large sample properties of estimates, linear models, multivariate analysis, empirical Bayes estimation, and statistical computing. Prerequisite: Mathematics 391 or consent of the instructor. Lecture-conference.

Economics

Econ 201: Introduction to Economic Analysis

- *UW-Madison Equivalent:* ECON 101/102 - PRINCIPLES OF MICROECONOMICS/PRINCIPLES OF MACROECONOMICS
- *Instructor:* Prof. Denise Hare
- *Grade:* B-
- *School:* Reed College

- *Text:* N/A, No Documentation Available
- *Subject Matter:* Full course for one semester. This course will introduce students to the analytical approaches and tools of the economics discipline, and how these are used to examine current issues and problems that arise in the functioning of economic systems. Microeconomic theories of consumption, production, and exchange provide much of the analytical framework that will be utilized, although we will also explore some relevant applications to the macroeconomy. A central feature of this course is the examination of markets and how they determine what is produced and how it is allocated. We also devote some attention to evaluating market outcomes, to thinking about remedies to resource allocation problems that markets cannot solve, and to thinking about the factors that determine long-run productive capacity and income potential. Lecture-conference.

Econ 312: Theory & Practice of Econometrics

- *UW-Madison Equivalent:* ECON 704/705 - ECONOMETRICS 1/2
- *Instructor:* Prof. Jeffrey Parker
- *Grade:* B
- *School:* Reed College
- *Text:* Principles of Econometrics, 4th ed., Hill, R. Carter, William E. Griffiths, and Guan C. Lim, Other Texts Detailed on Course Page
- *Subject Matter:* Full course for one semester. An introduction to the statistical methods commonly used in economic research. Classroom development of theoretical material is combined with extensive hands-on practice of econometric techniques. Statistical methods discussed include estimation and inference in simple and multiple linear regression models, detection and correction of autocorrelation and heteroskedasticity, time-series models and distributed lags, and estimation of systems of simultaneous equations. Considerable emphasis is placed on learning to specify, implement, and evaluate tests of economic hypotheses. Prerequisites: Economics 201 and Mathematics 141 or similar introduction to statistics, or consent of the instructor. Lecture-conference.

Econ 313: Microeconomic Theory

- *UW-Madison Equivalent:* ECON 701 - MICROECONOMICS 1
- *Instructor:* Prof. Jon Rork
- *Grade:* C-
- *School:* Reed College
- *Text:* N/A, No Documentation Available
- *Subject Matter:* Full course for one semester. This course provides a thorough exposition of neoclassical theories of producer and consumer behavior. Considerable attention is devoted to understanding the economic concept of efficiency and demonstrating the efficiency of competitive equilibrium in a general equilibrium framework. The efficiency of market outcomes under alternative assumptions is also examined, and some time is devoted to discussing social choice theory and the limits of the market. Prerequisites: Economics 201 and Mathematics 111, or consent of the instructor. Lecture-conference.

Econ 314: Macroeconomic Theory

- *UW-Madison Equivalent:* ECON 702 - MACROECONOMICS 1
- *Instructor:* Prof. Kimberly Clausing
- *Grade:* A
- *School:* Reed College
- *Text:* Advanced Macroeconomics, 5th ed., Romer, David, Other Texts Detailed on Recent Course Page
- *Subject Matter:* Full course for one semester. A detailed introduction to modern theories of economic growth and business cycles. Emphasizes the derivation of relationships among aggregate variables from assumptions about the behavior of households and firms. Examines empirical evidence for and against macroeconomic theories. Prerequisites: Economics 201 and Mathematics 111, or consent of the instructor. Lecture-conference.

Econ 315: Game Theory

- *UW-Madison Equivalent:* ECON 521 - GAME THEORTY AND ECONOMIC ANALYSIS
- *Instructor:* Prof. Jon Rork
- *Grade:* B+
- *School:* Reed College
- *Text:* N/A, No Documentation Available
- *Subject Matter:* Full course for one semester. Game theory is the study of strategy. This course introduces students to game theory and its application in a wide range of situations. We study various classes of games, including static and dynamic games as well as those of complete and incomplete information. We also consider various solution concepts, including iterated elimination of dominant strategies and Nash equilibrium. Numerous refinements of the Nash equilibrium concept, including subgame perfect Nash equilibrium, Bayesian Nash equilibrium, and perfect Bayesian equilibrium, are also considered. We apply game theory to the study of competition, the commons, bargaining, auctions, conventions, institutions, and political decision-making. Prerequisite: Economics 201 and Mathematics 111, or the equivalent. Lecture-conference.

Econ 341: Monetary and Fiscal Policy

- *UW-Madison Equivalent:* ECON 735 - MONETARY AND FINANCIAL THEORY
- *Instructor:* Prof. Jeffrey Parker
- *Grade:* B

- *School:* Reed College
- *Text:* Advanced Macroeconomics, 5th ed., Romer, David, Other Texts Detailed on Recent Course Page
- *Subject Matter:* Full course for one semester. A study of classical and contemporary monetary theory, the structure and operation of private and public monetary and financial institutions, and the techniques and objectives of monetary and fiscal policy. Contemporary policy problems emphasized include maintenance of full employment and economic growth, prevention of inflation, and economic stabilization. Prerequisite: Economics 201. Conference.

Econ 354: Economics of Science & Technology

- *UW-Madison Equivalent:* ECON 467/475 - INTERNATIONAL INDUSTRIAL ORGANIZATIONS/ECONOMICS OF GROWTH
- *Instructor:* Prof. Jeffrey Parker
- *Grade:* A
- *School:* Reed College
- *Text:* The Economics of Knowledge, 2004, Foray, Dominique, Other Texts Detailed on Recent Course Page
- *Subject Matter:* Full course for one semester. An introduction to the economics of growth, innovation, and technological change in industrialized market economies. The neoclassical growth model is used as a theoretical basis for exploring empirical studies measuring the causes of economic growth. The causes and nature of innovative activity, as well as its effect on technological progress, are explored. Issues of appropriability and diffusion of technology are addressed. Industry and country studies are used to gauge the effect of technological change on economic performance. Prerequisite: Economics 201. Conference.

Econ 383: International Trade

- *UW-Madison Equivalent:* ECON 364 - SURVEY OF INTERNATIONAL ECONOMICS
- *Instructor:* Prof. Kimberly Clausing
- *Grade:* B
- *School:* Reed College
- *Text:* Assorted Academic Publications Detailed on Course Page
- *Subject Matter:* Full course for one semester. This course analyzes the causes and consequences of international trade. The theory of international trade and the effects of trade policy tools are developed in both perfect and imperfect competition, with reference to the empirical evidence. This framework serves as a context for a discussion of several important issues: the effect of trade on income inequality, the relationship between trade and the environment, the importance of the World Trade Organization, strategic trade policy, the role of trade in developing countries, and the effects of free trade agreements. Prerequisite: Economics 201. Conference.

Econ 392: Health In Poor Countries

- *UW-Madison Equivalent:* ECON/POP HLTH 848 - HEALTH ECONOMICS
- *Instructor:* Prof. Nicholas Wilson
- *Grade:* A-
- *School:* Reed College
- *Text:* N/A, No Documentation Available (Assorted Academic Publications)
- *Subject Matter:* Full course for one semester. Poor health is one of the biggest problems facing poor people in poor countries. Diarrhea, HIV/AIDS, intestinal helminthes, iodine deficiency, malaria, sleeping sickness, tuberculosis, vitamin A deficiency, and yellow fever are common problems in much of the developing world. These health problems reduce happiness directly, as well as indirectly through decreased cognitive and physical ability in productive activities. This course uses microeconomic and econometric tools to examine the causes and consequences of a few of these sources of poor health. Unlike a medical or public health approach to these topics, we will focus on behavioral aspects of these problems. Some of the questions we will explore include: How responsive is demand for health inputs to changes in the price of health inputs? How does economic activity affect health behavior? How does information affect health behavior? Prerequisite: Economics 201. Conference.

Econ 418: Behavioral Economics

- *UW-Madison Equivalent:* ECON 455 - BEHAVIORAL ECONOMICS
- *Instructor:* Prof. Jon Rork
- *Grade:* B+
- *School:* Reed College
- *Text:* N/A, No Documentation Available (Assorted Behavioral Economics Books, e.g. Thinking, Fast and Slow)
- *Subject Matter:* Full course for one semester. This course will provide an introductory overview of the structure and operations of financial markets, basic theories of portfolio management, and how recent contributions from behavioral economics have improved our understanding of human decision-making within a social and highly interactive context. Students will learn about the basic functioning of financial markets in terms of trading, arbitraging, hedging, leveraging, etc.; their major products, like commodities, bonds, stock, options; and the basic theories of portfolio management and price formation. We will discuss how original theories have evolved to include contributions from behavioral economics about decision-making under risk and uncertainty, including behavioral biases. A discussion of price equilibria and the efficient market hypothesis will be combined with criticisms from behavioral finance on the existence of market bubbles and price anomalies, like the equity puzzle, herding, over-under reaction to new information, etc. The course will be mostly theoretical, but it will include occasional practical exercises in which students will gather actual financial data and perform simple corporate stock valuations. Prerequisite: Economics 201. Conference.

Other

Econ/Math 470: Thesis (Economics/Mathematics)

- *UW-Madison Equivalent:* STAT 628 - DATA SCIENCE PRACTICUM
- *Instructor:* Prof. Andrew Bray & Prof. Yan Lau
- *Grade:* B
- *School:* Reed College
- *Text:* N/A, References Noted in Paper
- *Subject Matter:* Full course for one year. Students participate in a year-long research project in the field(s) of their study.