SIU CARBONDALE Southern Illinois University

Table of Contents

Statistics

Statisticians make meaning from data using a combination of mathematics and design thinking. Studies from several independent sources identify statistics as a critical area in which demand for skilled knowledge workers will expand dramatically and quickly. The US Bureau of Labor predicts that employment will grow 30% by 2028, and reports median annual wage of $86,630 in Illinois. The Bureau also reports that these jobs are disproportionately concentrated in Illinois, with a location quotient of 1.10. Meanwhile US News and World Report ranks “Statistician” the #6 best job, with above average upward mobility and flexibility and below average stress.

Bachelor of Science (B.S.) in Statistics Degree Requirements

Degree Requirements	Credit Hours	
University Core Curriculum Requirements		39
School of Mathematical and Statistical Sciences Academic Requirements		12
Requirements for Statistics Major		43
MATH 150, MATH 221, MATH 250, MATH 251	14	
One of STAT 102, STAT 282, STAT 403, STAT 480	3	
CS 202	4	
MATH 305 or MATH 475	3	
STAT 473, STAT 474, STAT 483, STAT 484, STAT 485, STAT 486	19	
Electives		26
Total		120

Statistics Courses

STAT102 - Basics of Data Science (University Core Curriculum) This course addresses the fundamental challenge of how to extract information from data. It focuses on a set of problems from statistics and data science such as describing the relationship between observations, testing hypotheses, estimating

confidence, and prediction. Prerequisite: High School Algebra, some computer experience. Credit Hours: 3

STAT282 - Introduction to Statistics (University Core Curriculum Course) Designed to introduce beginning students to basic concepts, techniques, and applications of statistics. Topics include the following: organization and display of data, measures of location and dispersion, elementary probability, statistical estimation, and parametric and nonparametric tests of hypotheses. Prerequisite: MATH 108 with a grade of C or better. Satisfies University Core Curriculum Mathematics requirement in lieu of 110 or 101. Credit Hours: 3

STAT403 - Basic Short-Term Actuarial Mathematics This course examines loss models including severity models, aggregate loss, estimation, ratemaking and reserving, and estimation. This course prepares students for Exam FAM-S. Prerequisite: STAT 483 with a grade of C or better. Credit Hours: 3. Credit Hours: 3

STAT473 - Reliability and Survival Models Introduction to statistical analysis of data on lifetime, including hazard functions and failure distributions; estimation and hypothesis testing in life testing experiments with complete as well as censored data. Prerequisite: MATH 480 or MATH 483 or STAT 483 with a grade of C or better. Credit Hours: 3

STAT474 - Time Series An introduction to time series: AR, MA and ARIMA models; estimation, time series models. Prerequisite: MATH 480 or STAT 480 or MATH 483 or STAT 483 with a grade of C or better. Credit Hours: 3

STAT480 - Probability, Stochastic Processes and Applications I Introduction to the central topics of modern probability including elementary stochastic processes; random variables and their properties; sum of independent random variables and the Central Limit Theorem; random walks; discrete time finite state Markov chains; applications to random number generators and image and signal processing. Also generating functions, conditional probability, expectation, moments. Prerequisite: MATH 250 with a grade of C or better. Credit Hours: 3

STAT483 - Mathematical Statistics in Engineering and the Sciences Develops the basic statistical techniques used in applied fields like engineering, and the physical and natural sciences. Principal topics include probability; random variables; expectations; moment generating functions; transformations of random variables; point and interval estimation; tests of hypotheses. Applications include one-way classification data and chi-square tests for cross classified data. Prerequisite: MATH 250 with a grade of C or better. Credit Hours: 4

STAT484 - Applied Regression Analysis and Experimental Design Introduction to linear models and experimental design widely used in applied statistical work. Topics include linear models; analysis of variance; analysis of residuals; regression diagnostics; randomized blocks; Latin squares; factorial designs. Applications include response surface methodology and model building. Computations will require the use of a statistical package such as SAS. Prerequisite: MATH 221, and either MATH 483 or STAT 483, with grades of C or better. Credit Hours: 3

STAT485 - Applied Statistical Methods Introduction to sampling methods and categorical data analysis widely used in applied areas such as a social and biomedical sciences and business. Sampling methods topics include: simple random and stratified sampling; ratio and regression estimators. Categorical data analysis topics include: contingency tables; loglinear models; logistic regression; model selection; use of a computer package. Prerequisite: MATH 483 or STAT 483 with a grade of C or better. Credit Hours: 3

STAT486 - Statistical Computing This course covers Statistical Computing Software packages such as R and SAS; helps prepare students for SAS certification. Topics include obtaining and analyzing output for regression, experimental design, and generalized linear models. Prerequisites: MATH 484 or STAT 484, and CS 202 both with a grade of C or better. Credit Hours: 3

Statistics Faculty

Ban, Dubravka, Professor and Director, Mathematics, Ph.D., University of Zagreb, 1998; 2002. Algebra, representation theory, automorphic L-functions.

Bhattacharya, Bhaskar, Professor, Statistics, Ph.D., University of Iowa, 1993; 1993. Order restricted statistical inference, statistical information theory.

Calvert, Wesley, Professor, Mathematics, Ph.D., University of Notre Dame, 2005; 2010. Mathematical logic and theoretical computation.

Choiy, Kwangho, Associate Professor, Mathematics, Ph.D., Purdue University, 2012; 2015. Number theory, automorphic forms and representation theory.

Gluck, Mathew, Assistant Professor, Mathematics, Ph.D., University of Florida, 2014; 2022. Nonlinear elliptic partial differential and integral equations arising in geometry, biology and physics.

Kocik, Jerzy, Professor, Mathematics, Ph.D., Southern Illinois University, 1989; 2002. Differential geometry and lie algebras.

Lauderdale, Lindsey-Kay, Assistant Professor, Mathematics, Ph.D., University of Florida, 2014; 2022. Algebraic graph theory, enumerative combinatorics, extremal graph theory, group theory, and their applications.

Olive, David, Professor, Statistics, Ph.D., University of Minnesota, 1998; 1999. Applied robust statistics, regression graphics, applied probability.

Samadi, S. Yaser, Associate Professor, Statistics, Ph.D., University of Georgia, 2014; 2014. Multivariate and matrix time series analysis.

Schurz, Henri U., Professor, Mathematics, Ph.D., Humboldt University, 1997; 2001. Stochastic analysis, stochastic dynamical systems, mathematical finance.

Sullivan, Michael C., Professor, Mathematics, Ph.D., University of Texas at Austin, 1992; 1996. Topological dynamics.

Xiao, Mingqing, Professor, Mathematics, Ph.D., University of Illinois at Urbana-Champaign, 1997; 1999. Partial differential equations, dynamical systems, control theory and applications.

Xu, Dashun, Professor, Mathematics, Ph.D., Memorial University of Newfoundland, 2004; 2006. Mathematical biology.

Xu, Jianhong, Professor, Mathematics, Ph.D., University of Connecticut, 2003; 2005. Partial differential equations, control theory, optimization theory, dynamical systems, computational science.

Last updated: 03/06/2024