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

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

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

**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.

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


**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.


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


**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.


Last updated: 03/06/2024