### Statistics

**STAT 430  **Topics in Applied Statistics  credit: 3 OR 4 hours.**

Formulation and analysis of mathematical models for random phenomena; extensive involvement with the analysis of real data; and instruction in statistical and computing techniques as needed. 3 undergraduate hours. 4 graduate hours. May be repeated with approval. Prerequisite: STAT 410 or STAT 420; or consent of instructor.

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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>60247</td>
<td>Lecture</td>
<td>1GR</td>
<td>09:30 AM - 10:50 AM</td>
<td>TR</td>
<td>103 - Transportation Building</td>
<td>Hua, L</td>
</tr>
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Credit Hours: 4 hours  
Machine Learning Financial Data  
Restricted to students in the Statistics department.  
Restricted to Graduate - Urbana-Champaign.  
For Statistics course registration information: go.illinois.edu/StatisticsRegistration  
TOPIC: Machine Learning for Financial Data  
Description: This course introduces modern machine learning techniques that are tailored for analyzing financial data. Topics include Financial Data Preprocessing, Ensemble Methods, Cross Validation, Convolutional Neural Networks, Recurrent Neural Networks with Long Short-Term Memory / Gated Recurrent Units, Generative Adversarial Networks. The emphasis is on the basics of these methods and their relevant applications with financial data. PREREQS: A course in linear regression, such as STAT 420 or STAT 425; and basic knowledge about classical machine learning techniques at the level of the book "An Introduction to Statistical Learning"; and basic skills in using R to implement machine learning algorithms and conduct data analysis;

| 60249 | Lecture        | 1UG     | 09:30 AM - 10:50 AM | TR   | 103 - Transportation Building | Hua, L     |

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| 69375 | Lecture-Discussion | AG | 02:00 PM - 03:50 PM | M | 126 - Grad Sch of Lib & Info Science | Stodden, V |

Credit Hours: 4 hours  
Introduction to Data Science  
Restricted to students in the Statistics department.  
Restricted to Graduate - Urbana-Champaign.

| 69376 | Lecture-Discussion | AU | 02:00 PM - 03:50 PM | M | 126 - Grad Sch of Lib & Info Science | Stodden, V |

Credit Hours: 3 hours  
Introduction to Data Science  
Restricted to Statistics or Statistics & Computer Science major(s). Restricted to Undergrad - Urbana-Champaign.
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<tr>
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<th>Location</th>
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<tr>
<td>69110</td>
<td>Discussion/Recitation</td>
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<td>G32 - Foreign Languages Building</td>
<td>Fagen-Ulmschneider, W Flanagan, K</td>
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<td></td>
<td>Lecture</td>
<td>09:00 AM - 09:50 AM</td>
<td>MWF</td>
<td>G32 - Foreign Languages Building</td>
<td>Fagen-Ulmschneider, W Flanagan, K</td>
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Credit Hours: 3 hours
Data Science Discoveries
Instructor Approval Required
Restricted to Undergrad - Urbana-Champaign.

STAT 430: DS is a pilot course designated for approx. 30 undergraduate students that will evolve for Fall 2019 for increased capacity. The normal STAT 430 prerequisites of STAT 410 or STAT 420, do not apply for this pilot course. Pilot Course will transition to STAT 107 effective FA19. Data Science Discovery is the intersection of inferential thinking, computational thinking, and real-world relevance. This course empowers a student to analyze data arising from real-world events to understand the phenomenon.

Throughout the semester, students will have hands-on-analysis of real-world datasets including economic data, statistical abstract data, document collections, geographical data, and social networks. In each experience, students reflect on the social issues surrounding data analysis such as privacy and design.

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<tbody>
<tr>
<td>69346</td>
<td>Online</td>
<td>ARRANGED</td>
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<td>Eddelbuettel, D</td>
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Credit Hours: 4 hours
DataScience ProgrammingMethods
Restricted to students in the Statistics department.
Restricted to Graduate - Urbana-Champaign.

This course provides the computational foundation for rigorous data science work, both applied and in research. Starting from key foundations (the shell, git, Markdown and SQL), we focus on a solid introduction to programming in R. Next we discuss keys to reproducible computing (R packages, Docker) as well as some computational and algorithmic foundations. Finally, we examine in some detail extensions for better performance, notably using C++ with R. Course Information: 3 undergraduate hours. 4 graduate hours. May be repeated with approval. Prerequisite: STAT 410, STAT 420, and STAT 425 or consent of instructor. Students who previously enrolled in STAT 385 should not register for this course.

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