Syllabus

OPIM 5603: Statistics in Business Analytics
Fall 2019
Operations and Information Management
University of Connecticut

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Instructor

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Email Correspondence with Instructor and Teaching Assistant

Any emails to the instructor/teaching assistant should have subject line "OPIM 5603: Question Title".

Course Objectives

This course offers an advanced level exploration of statistical techniques for data analysis. We shall study the concepts of population and sample; discuss the difference between population parameters and sample statistics, and how to draw an inference from known sample statistics to usually unknown population parameters. Topics will focus on rigorous statistical estimation and testing. The course will also prepare students with the skills needed to work with data using analytics software.

In particular, this course will introduce and use the R software platform to illustrate the material. R is a very powerful, open-source statistical computing and programming language that is being increasing adopted by organizations.

Learning Objectives

Upon completion of this course, students should be able to:

- Use R competently
- Understand essential principles of probability
- Run statistical hypothesis tests and regressions for understanding trends in data

Class Website

The course homepage is available at HuskyCT. The class schedule, assignment requirements, exam dates, grades, and other important announcements (including course updates) will be posted on HuskyCT as the class progresses. It is your responsibility to check the class website regularly for updated information.

Grade Breakdown

Component	% of Final Grade
2 Exams	25% each $\times$ 2 = 50%
10 Homeworks	5% each $\times$ 10 = 50%

The final grades will be curved (should it be needed) as the instructor sees fit. All assignments must be submitted on time, according to the course schedule on the final page of the syllabus. No credit will be given for assignments submitted after the posted deadlines.

Books and Software

There is no required textbook. There are however many great references for statistics and R which student can buy should they want extra resources.

- Paradis, E. 'R for Beginners'. Available online at https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf
- Crawley, M. 'Statistics: An Introduction using R', second edition, Wiley, 2015. ISBN 978-1-118-94109-6
- Dalgaard, P. 'Introductory Statistics with R', second edition, Springer, 2008. ISBN 978-0-387-79053-4
- Levine, D.M., Stephan, D.F., and Szabat, K.A. 'Statistics for Managers Using Microsoft Excel (8th Edition)'

We will use the R software platform and RStudio. You can download R from the CRAN site at https://www.r-project.org/. After you install R, you can download and install RStudio at https://www.rstudio.com/.

To ensure we are commonly using the same software version, please download the following versions:

- RStudio version 1.2.1335
- R version 3.6.1

It is expected that students will only use the R packages covered in class to complete homework assignments and exam questions. If a student would like to use another package, it is his/her responsibility to contact the instructor ahead of time for approval.

Exams

There will be two exams. Each is 2.5 hours long.

Exam	Dates
Exam 1	Thursday, October 1—9:30am-12:00pm
Exam 2	Thursday, December 5—9:30am-12:00pm

The exams must be completed individually. You are permitted to use any of the course materials, including but not limited to the course notes and the course books. You are also permitted to use the Internet.

Homework

There will be ten homework assignments. Homework assignments must be completed individually.

Policy on Late Assignments

Homeworks, assignments, and exams are expected to be completed and turned in by the time specified in the schedule. Any late assignment will be marked for no credit.

Schedule

(Subject to change - check HuskyCT regularly for an updated schedule)

- **Week 1: August 25 - August 31**
  - Thursday, August 29
    - Lecture 1 (9:00am - 12:00pm): Class overview, introduction to statistics, R basics
  - Friday, August 30
    - Homework 1 Released (12:00pm)
- **Week 2: September 1 - September 7**
  - Thursday, September 5
    - Homework 1 Due (8:59am)
    - Lecture 2 (9:00am - 12:00pm): More on R, descriptive measures, visualizing data
  - Friday, September 6
    - Homework 2 Released (12:00pm)
- **Week 3: September 8 - September 14**
  - Thursday, September 12
    - Homework 2 Due (8:59am)
    - Lecture 3 (9:00am - 12:00pm): Introduction to probability
  - Friday, September 13
    - Homework 3 Released (12:00pm)
- **Lecture 4: September 15 - September 21**
  - Thursday, September 19
    - Homework 3 Due (8:59am)
    - Lecture 4 (9:00am - 12:00pm): Probability distributions
  - Friday, September 20
    - Homework 4 Released (12:00pm)
- **Week 5: September 22 - September 28**
  - Thursday, September 26
    - Homework 4 Due (8:59am)
    - Lecture 5 (9:00am - 12:00pm): Sampling distributions, confidence intervals
  - Friday, September 27
    - Homework 5 Released (12:00pm)

- **Week 6: September 29 - October 5**
  - Thursday, October 3
    - Homework 5 Due (8:59am)
    - NO CLASS!
- **Week 7: October 6 - October 12**
  - Thursday, October 10
    - Exam 1 (9:30am - 12:00pm)
  - Friday, October 11
    - Homework 6 Released (12:00pm)
- **Week 8: October 13 - October 19**
  - Thursday, October 17
    - Homework 6 Due (8:59am)
    - Lecture 7 (9:00am - 12:00pm): Hypothesis testing I
  - Friday, October 18
    - Homework 7 Released (12:00pm)
- **Week 9: October 20 - October 26**
  - Thursday, October 24
    - Homework 7 Due (8:59am)
    - Lecture 8 (9:00am - 12:00pm): Hypothesis testing II
  - Friday, October 25
    - Homework 8 Released (12:00pm)
- **Week 10: October 27 - November 2**
  - Thursday, October 31
    - Lecture 8 (9:00am - 12:00pm): Linear Regression I
- **Week 11: November 3 - November 9**
  - Thursday, November 7
    - Homework 8 Due (8:59am)
    - Lecture 9 (9:00am - 12:00pm): Linear Regression II
  - Friday, November 8
    - Homework 9 Released (12:00pm)

- **Week 12: November 10 - November 16**
  - Thursday, November 14
    - Homework 9 Due (8:59am)
    - Lecture 10 (9:00am - 12:00pm): Generalized linear models
  - Friday, November 15
    - Homework 10 Released (12:00pm)
- **Week 13: November 17 - November 23**
  - Thursday, November 21
    - Homework 10 Due (8:59am)
    - Lecture 11 (9:00am - 12:00pm): Non-parametric statistics
- **Week 14: November 24 - November 30**
  - Thanksgiving Break!
- **Week 15: December 1 - December 7**
  - Thursday, December 5
    - Exam 2 (9:30am - 12:00pm)

Student Responsibility and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. This section provides a brief overview to important standards, policies and resources.

Academic Integrity

Academic Misconduct in any form is in violation of the University of Connecticut Student Code and will not be tolerated. This includes, but is not limited to: copying or sharing answers on tests, plagiarism, and/or having someone else do your academic work. Depending on the act, a student could receive an F grade on the test/assignment, F grade for the course, and could be suspended or expelled from the University.

If you have any questions regarding what is allowed/disallowed, please contact me directly.

Student Code

You are responsible for acting in accordance with the University of Connecticut's Student Code. Review and become familiar with these expectations. In particular, make sure you have read the section that applies to you on Academic Integrity:

- Academic Integrity in Undergraduate Education and Research
- Academic Integrity in Graduate Education and Research

Copyright

Copyrighted materials within the course are only for the use of students enrolled in the course for purposes associated with this course and may not be retained or further disseminated neither in print nor digital form.

Policy against Discrimination, Harassment and Inappropriate Romantic Relationships

The University is committed to maintaining an environment free of discrimination or discriminatory harassment directed toward any person or group within its community students, employees, or visitors. Academic and professional excellence can flourish only when each member of our community is assured an atmosphere of mutual respect. All members of the University community are responsible for the maintenance of an academic and work environment in which people are free to learn and work without fear of discrimination or discriminatory harassment. In addition, inappropriate Romantic relationships can undermine the Universitys mission when those in positions of authority abuse or appear to abuse their authority. To that end, and in accordance with federal and state law, the University prohibits discrimination and discriminatory harassment, as well as inappropriate Romantic relationships, and such behavior will be met with appropriate disciplinary action, up to and including dismissal from the University. Refer to the Policy against Discrimination, Harassment and Inappropriate Romantic Relationships for more information.

Sexual Assault Reporting Policy

To protect the campus community, all non-confidential University employees (including faculty) are required to report assaults they witness or are told about to the Office of Diversity & Equity under the Sexual Assault Response Policy. The University takes all reports with the utmost seriousness. Please be aware that while the information you provide will remain private, it will not be confidential and will be shared with University officials who can help. Refer to the Sexual Assault Reporting Policy for more information.