Instructor: Jyothsna Sainath  
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Class Hours: TR 4:00 - 5:30 PM, LCB 121.

Office Hours: W 4:30 - 5:30 PM, or by appointment.

Course Material:  
Required Textbook: An Introduction to Applied Multivariate Analysis with R  
by Everitt B. and Hothorn B. (EH)  
Suggested Textbook: Applied Multivariate Statistical Analysis  

We will on occasion use other material. References will be provided as we go.

Prereq: You must have at least a ‘C’ in Math 6010. This course assumes a solid knowledge of Calculus (at least Calc I, II, and III), linear algebra (Math 2270), probability theory (Math 5010), and mathematical statistics (Math 5080-5090). If you’re not comfortable with all of those you will probably struggle in this course.

Course Content: Please make sure to go over and work examples from the chapter titled Data visualization in EH. The tools discussed will be useful for the rest of the course, but can essentially be self-taught.

- 1- Multivariate linear regression (§7 JW)  
- 2- Generalized Linear Models (§2 McCullagh and Nelder)  
- 3- Principle Components Analysis and SPCA (§8 JW, §3 EH)  
- 4- Factor Analysis (§9 JW, §5 EH)  
- 5- Discriminant Analysis  
- 6- Cluster Analysis (§6 EH)  
- 7- Tree Based Models  

If time permits, we may cover some additional material.

Students are expected to be able to code in at least one of R, Python or Matlab. Students who do not know how to code are advised to familiarize themselves with one of these environments via the many resources available online. Students who are familiar with environments other than these may check with the instructor if they prefer to submit code in a different language. Depending on the assignment, this may be a possibility.

Course Details:  
- A set of partially typed lecture notes will be posted periodically on Canvas. Ideally students should download or print these for use in class.
**Home Work:** There will be roughly 1 HW in a month. There will be no HW drops and no late submissions will be accepted.

<table>
<thead>
<tr>
<th>HW</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>HW1</td>
<td>Thursday, 10th February</td>
</tr>
<tr>
<td>HW2</td>
<td>Thursday, 3rd March</td>
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<tr>
<td>HW3</td>
<td>Thursday, 31st March</td>
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<tr>
<td>HW4</td>
<td>Thursday, 21st April</td>
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**Exams:** There will be two take home assignments (in place of exams); each a compilation of mini-projects geared to give the students practical experience with simulation, and analysis of data and with compiling the results in the form of a report. Students are required to type up their work and submit it on Canvas. The due dates are below:

- Mid Term: Saturday, 19th March, 10 pm.
- Final: Saturday, 30th April, 10 pm.

No late submissions will be accepted and students are expected to arrange personal work around the announced due dates. However, please contact the instructor in the event of illness or other extenuating circumstances.

**Grading:** The minimum scores for a certain grade category are: 90 for an A, 80 for a B, 70 for a C and so on. This is a rough guide and may be subject to change. The break up of points in this course is as follows:

- Homework: 60 %
- Mid Term: 20 %
- Final: 20 %

**COVID-19:** Students must self-report if they test positive for COVID-19 via coronavirus.utah.edu. Also, I understand the stress related to contracting COVID-19 or having a household member contract COVID-19. Please feel free to contact me if you are in this situation so that we could find a way to keep you in touch with course material.

**The Americans with Disabilities Act:** The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

**Addressing Sexual Misconduct:** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veterans status or genetic information. If you or someone you know has been harassed or assaulted on the basis of your sex, including sexual orientation or gender identity/expression, you are encouraged to report it to the University’s Title IX Coordinator; Director, Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or to the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to police, contact the Department of Public Safety, 801-585-2677(COPS).

**Campus Safety:** The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu