MA2611

Applied Statistics

This course is designed to introduce the student to data analytic and applied statistical methods commonly used in industrial and scientific applications as well as in course and project work at WPI. Emphasis will be on the practical aspects of statistics with students analyzing real data sets on an interactive computer package. Topics covered include analytic and graphical representation of data, exploratory data analysis, basic issues in the design and conduct of experimental and observational studies, the central limit theorem, one and two sample point and interval estimation and tests of hypotheses. Recommended background: MA1022.

Where and When

Lectures: Mondays, Tuesdays, Thursdays, and Fridays from 2:00pm-2:50pm in AK 116
Labs: Wednesdays in KH202
12:00-1:50pm *or* 8:00-9:50am *or* 2:00-3:50pm *or* 10:00-11:50am *or* 4:00-5:50pm (only pick one)

Instructor information

Prof. Randy Paffenroth
Office location: 105C Stratton Hall
Office hours: 3pm-4pm Mondays and 9-11am Thursdays. Other times are available by appointment, and walk-ins are always welcome if I am around and not otherwise indisposed.
Best ways to contact me:

- WPI email: rcpaffenroth@wpi.edu
- Gmail and Google hangouts: randy.paffenroth@gmail.com
- Office phone: (508) 831-6562

I should be able to turn around email questions relatively quickly 9am-5pm, Monday-Friday. My availability at night and on weekends is more limited and I certainly check my email far more infrequently, but you may feel free to try and contact me.

Teaching Assistants

Name	Email	Office location	Office hours
Lu Chen	lchen5@wpi.edu	SH204	Friday 12-2pm
Jiani Yin	jianiyin@wpi.edu	SH204	Wednesday 2-3pm
Hong Zhang	hzhang@wpi.edu	SL405	Wednesday 1-3pm

High level course goals and learning objectives

By the end of the class you should be able to:

- *Apply* basic statistical techniques to data sets from real world problems.
- *Use computers* to analyze and understand data.
- *Make inferences* using samples of a population.
- *Asses* the quality of insights gained from examining data.
- Become *Data Literate*!

Recommended background for course

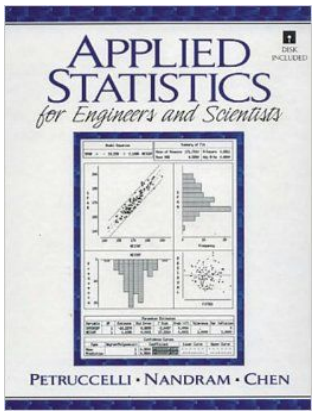
Prerequisite: as an introductory course, the prerequisites are rather limited and MA1022 (Calculus 2) is the only recommended background.
The most important things that you bring to the course that support your success are:

- An ability to *work hard*
- An open mind and willingness to *participate* in the learning experience
- A desire to *learn* about data

You will need to be able get your hands dirty playing with, processing, and plotting data! Accordingly, as part of this class you will be learning about the computer language R through the computer labs. Now, with that being said, this is not intended to be a programming course, but actually working with data will be extremely important (i.e., the results of the code will be graded)!

Textbook

Applied Statistics for Engineers and Scientists
J. D. Petruccelli, B. Nandram, M. Chen
PDF free on MYWPI
Hard copy at bookstore for $31



Recommended texts

Other texts that would be useful for the course are:

- "How to Lie with Statistics", by Darrell Huff and Irving Geis. http://www.amazon.com/How-Lie-Statistics-Darrell-Huff/dp/0393310728
- Learning R: A Step-by-Step Function Guide to Data Analysis By Richard Cotton O'Reilly Media, September 2013

Evaluation/Grades

Final grades will be determined based upon the following breakdown:

Homeworks (5 assignments)	20%
Labs (7 assignments)	20%
Exam 1 (roughly Chapter 1-3)	15%
Exam 2 (roughly Chapter 4)	20%
Exam 3 (roughly Chapter 5-6)	25%

Depending on the overall performance of the class, I reserve the right to *curve* the final grade, either *up* or *down*. The three exams will be in class and **no collaboration will be allowed**. The exams be graded based upon demonstrated understanding of key concepts. For each exam, you are allowed to bring in one (1) 8 ½ by 11 sheet of paper (double sided and either printed or handwritten) with whatever notes you want for the exam and you will need a calculator. Only calculators with no external connectivity will be allowed, so, for example, cell phone based calculators are not allowed. The homework problems will be performed **individually** and will be graded for demonstrated understanding of key concepts and quality of presentation. Working in **groups on the labs is encouraged**, but each person must **turn in their work individually**, and the turned in assignment must represent their individual thoughts. **Copying of lab assignments is not acceptable.**

Make-up Exam Policy

Make-up exams will only be allowed in the event of a documented emergency or religious observance. The exam dates are listed on the syllabus and you are responsible for avoiding conflicts with the exams.

Late Assignment Policy

In general, late assignments will be heavily penalized (50% of the possible grade). If you think that you will not be able to submit a completed assignment then it is best to submit as much as you can on time, so that at least part of the assignment will not be penalized. If an emergency arises or you know in advance about a conflict please let Prof. Paffenroth know as soon as possible.

Lab Attendance and Policy

- Go to the right section. Attend exactly the section you are registered.
- Be on time.
- Respect the lab leader and follow the instructions.
- No makeups in general. For unavoidable difficulties, make special arrangement *in advance* with Prof. Paffenroth instead of the TAs. *No makeups without prior arrangement, no exceptions.*

Collaboration and Academic Honesty Policy

Collaboration is prohibited on the exams and homeworks. All violations of the collaboration policy will be handled in accordance with the WPI Academic Honesty Policy:

http://www.wpi.edu/Pubs/Policies/Honesty/Students/

Collaboration is encouraged on lab assignments, but each person must turn in their work individually, and the turned in assignment must represent their individual thoughts. Copying of lab assignments is not acceptable.

Accommodation for Special Needs or Disabilities

If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me, please make an appointment with me as soon as possible. If you have not already done so, students with disabilities who believe that they may need accommodations in this class are encouraged to contact the Office of Disability Services as soon as possible to ensure that such accommodations are implemented in a timely fashion. This office is located in the West St. House (157 West St), (508) 831-4908.

Accommodation for Religious Observance

Students requiring accommodation for religious observance must make alternate arrangements with Prof. Paffenroth at least one week before the date in question.

Personal Emergencies

In the event of a medical or family emergency, please contact Prof. Paffenroth to work out appropriate accommodations.

Schedule

On this schedule the homework and exam dates are fixed. On the other hand, because this is the first time I am teaching the course, I reserve the right to change the order and content of lectures to improve the learning experience for the course. I will ensure that the homeworks and exams match the material actually covered.

Monday	Tuesday	Wednesday	Thursday	Friday
	10/27 Chap 1	10/28 Lab 1 start	10/29 Chap 1/2	10/30 Chap 2
11/2 Chap 2	11/3 Chap 2 HW1 out	11/4 Lab 1 end Lab 2	11/5 Chap 3	11/6 Chap 3
11/9 Chap 3	11/10 Chap 3/Review HW1 due HW2 out	11/11 Lab 3	11/12 Exam 1	11/13 Chap 4
11/16 Chap 4	11/17 Chap 4 HW2 due HW3 out	11/18 Lab 4	11/19 Chap 4	11/20 Chap 4/Review
11/23 Exam 2	11/24 Chapter 5 HW3 due HW4 out			
11/30 Chap 5	12/1 Chap 5 HW4 due HW5 out	12/2 Lab 5	12/3 Chap 5	12/4 Chap 5
12/7 Chap 6	12/8 Chap 6 HW5 due	12/9 Lab 6	12/10 Chap 6	12/11 Chap 6
12/14 Chap 6	12/15 Chap 6/Review	12/16 Lab 7	12/17 Exam 3	