

Applied Statistics II

Meeting Time	MTRF: 10:00am–10:50am	
Location	Atwater Kent 116 Newell Hall	
Instructor	Prof. Fangfang Wang fwang4@wpi.edu	Office: SH 305B
Office Hours	Monday (In-person & Zoom): 11am–Noon; Tuesday (Zoom): 7:30pm–8:30pm; Friday (In-person & Zoom): 11am–Noon; Zoom link: https://wpi.zoom.us/j/91392758695 I am also available by appointment. Additional office hours will be offered prior to exams.	
Teaching Assistants	(i) Liu, Ming mliu5@wpi.edu	Office: SH 204
Office Hours	Wednesday (In person & Zoom): 12pm–1pm Thursday (In person & Zoom): 9am–10am Zoom link: https://wpi.zoom.us/j/99917500063 See Page 6 for Ming’s MTC hours.	
	(ii) Yang, Diyu dyang3@wpi.edu	Office: SH 204
Office Hours	Friday (In person & Zoom): 1pm–3pm Zoom link: https://wpi.zoom.us/j/9903651731 See Page 6 for Diyu’s MTC hours.	
Lab Meetings	D01: Tuesday 9:00am–9:50am, Kaven Hall 202 D02: Tuesday 4:00pm–4:50pm, Kaven Hall 202 D03: Wednesday 4:00pm–4:50pm, Kaven Hall 202 D04: Thursday 8:00am–8:50am, Kaven Hall 202	Yang, Diyu Yang, Diyu Liu, Ming Liu, Ming

Course Web Site: Canvas (<https://canvas.wpi.edu/>)

The Canvas site is the main platform through which this course will be managed. It contains the syllabus (this document), slides and lecture notes, practice exams, announcements, and other course materials. You are responsible for knowing the information in the materials that appear there.

Textbook

The course will roughly cover Chapters 7, 8, 9, and 11 of the following text:

- Textbook: Joe Petrucelli, Bal Nandram and Ming Hui Chen, *Applied Statistics for Scientists and Engineers*, Chapman Hall. See also <https://canvas.wpi.edu/courses/33516/files/folder/Textbook> for the text.
- Reference book: OpenIntro Statistics <https://www.openintro.org/book/os/>

Reading the corresponding chapter before each class is highly recommended. Additional learning materials will be posted prior to lectures on Canvas if needed.

Course Description and Objectives

In order to earn a passing grade in this course, you must demonstrate competence in the following course objectives. These objectives are divided into four major areas addressed by the four text chapters we will cover. These are (in order of coverage):

(I) **The Relationship Between Two Variables (Chapter 7)**: Use appropriate graphs (scatterplots) and summary measures (means, standard deviations and correlation) to summarize the relationship between two quantitative variables. Be able to (a) specify and fit (using least squares) a suitable simple linear regression model, (b) assess the quality of the fit, and (c) interpret the model. Be able to create and analyze one- and two-way tables for categorical data.

(II) **Multiple Regression (Chapter 8)**: Be able to build, fit, interpret, and check the aptness of multiple linear regression models.

(III) **The One-Way Model (Chapter 9)**: For both one-way and randomized complete block design (RCBD) models, be able to (a) fit, interpret, and check the model aptness; (b) test for equality of and conduct multiple comparisons of population means; (c) conduct an analysis of variance.

(IV) **Distribution-Free Inference (Chapter 11)**: Understand the basic ideas behind and the construction, use, and interpretation of the sign test, traditional rank-based tests, permutation tests, and bootstrap confidence and prediction intervals.

Recommended Background

MA2611 (Applied Statistics I) or equivalent is recommended. Calculus I-IV and linear algebra are also recommended.

Lecture Slides

I will post the lecture slides on Canvas in advance of the class lectures. However, these notes will be INCOMPLETE - so you will have to attend class to fill in the blanks.

Labs

You are required to attend labs (or discussion sessions) every week, according to the section for which you are registered. In lab, students will work on problems related to the material being covered in class. In every lab, you should turn in your lab report to the TA who will grade your report and return it to you in the next lab of coming week.

Lab Attendance and Policies:

- **Go to the right section.** You must attend the section you are registered for. You will get no credit for your work if you attend a different section.
- **Be on time.** You must be on time for Labs.
- **Be prepared.** You must come prepared to Lab, having attended the lectures and digested the relevant materials before the labs.

In reality, data analysis almost always rely on computing software. Many people use a spreadsheet, usually Microsoft Excel, for statistical calculations. I do not advise it for scientific work, and since I hope you aspire to scientific standards, I don't recommend it for this course. See <http://www.practicalstats.com/xlsstats/excelstats.html> for an enlightening discussion.

One of the most comprehensive and widely-used statistics programs is R, which is available freely. This is a good choice for anyone going on to more advanced statistics courses.

- We will learn R in the Lab works. Sample R codes will be provided for you to get started.
- To download and install R: <http://www.r-project.org>.
- A comprehensive R tutorial: <http://cran.r-project.org/doc/manuals/R-intro.html>.

Homework

There will be a homework assignment every week for your benefit and practice - they can also serve as a test of your level of materials being covered in class. Homeworks will help you to

- Gain a solid understanding of the course material.
- Be creative and think beyond the course material.

- Do better in the exams.

Homework will be assigned weekly. It will be best to start working on the problems early to avoid any last minute rush.

You can informally discuss some problems with your classmates but **the final work should be based on your own effort**. Please feel free to see the TAs and the instructor if you have any question.

Exams

There will be two exams based on the material covered until the latest lecture before each. Exams are closed-book, but **one double-sided 8.5 by 11" sized** cheat sheet is allowed for each student. No electronics are allowed during the exams except for a graphing calculator. Calculator apps on a smartphone, tablet, kindle, etc are not allowed. Practice exams will be posted online.

The dates for the exams are :

- **Midterm: Friday, April 8.**
- **Final: Tuesday, May 3 (Friday schedule).**

No exams allowed ahead of these dates.

Makeup exam will not be given unless a student notify me with a legitimate excuse by writing prior to the exam. **Make sure you do not select classes with conflicting exam dates.**

Attendance

Students are expected to attend all class meetings and participate in all activities in lectures and labs. Excused absences can be granted only by the instructor, whom must be informed in advance of the date of the absence except in cases of sudden illness or other emergency.

Grading

Source	Percentage
Labs	20%
Homework	20%
Midterm	20%
Final	30%
Participation	10%
Total	100%

Temporary final grade distribution:

A : [90 - 100]; B : [75 - 90); C : [60 - 75); NR : below 60.

The instructor reserves the right to modify the grading criteria, but not so as to lower the grade a student would have gotten under the criteria stated above.

Academic Honesty

Each student is expected to familiarize himself/herself with WPI's Academic Honesty policies which can be found at (<http://www.wpi.edu/offices/policies/honesty>). All acts of fabrication, plagiarism, cheating, and facilitation will be prosecuted according to the university's policy. If you are ever unsure as to whether your intended actions are considered academically honest or not, please see me.

Accommodations

Students with approved academic accommodations should plan to submit their accommodation letters through the Office of Accessibility Services (OAS) Student Portal. Should you have any questions about how accommodations can be implemented in this particular course, please contact me as soon as possible. Students who are not currently registered with the OAS but who would like to find out more information regarding requesting accommodations and what that entails should plan to contact them via email: AccessibilityServices@wpi.edu and/or via phone: (508) 831-4908.

Ground Rules

- Be courteous/respectful in class.
- E-mail etiquette - proper addressing/signature.
- Always send e-mails from your wpi e-mail account. E-mails sent from other accounts (gmail, yahoo etc.) may be filtered out.

How to Do Well in this Course?

- Attend and actively participate in the lectures. This includes being prepared for each day's activities.
- Check announcements/e-mails that I will post/send.
- Read all assigned materials (specially the class slides). It is best to read the material before the class in which they will be discussed.
- Try to do the homework assignments as best as you can and complete them on time.
- Participate in all the labs and submit all required lab reports on time.
- Get to know other students and do group sessions specially before exams.
- Prepare carefully for exams by going over the lecture slides, homework, and sample questions. Pay special attention to understanding concepts and ideas behind the formulas.

- If you are having trouble with the class, talk to me early on to get suggestions on how to do better. Do not wait until the last week to bring any problems to my attention.
- Take advantage of **Math Tutoring Center (MTC)**: You can also visit the MTC for help with this course.

Diyu Yang Monday: 2pm–4pm
Ming Liu Wednesday: 1pm–3pm

You do not need an appointment, but can drop in at any time. For more information, please check the following link: <https://canvas.wpi.edu/courses/33516/files?preview=4581292>

Schedule

Week	Monday	Tuesday	Wednesday	Thursday	Friday
3/14 - 3/18	Class starts				
3/21 - 3/25	HW1 due				
3/28 - 4/1	HW2 due				
4/4 - 4/8	HW3 due			Midterm	
4/11 - 4/15					
4/18 - 4/22	No class	HW4 due		No class	
4/25 - 4/29	HW5 due				
5/2 - 5/3	Final				

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00-9:00				D04	
9:00-10:00		D01		Liu	
10:00-11:00	Class	Class		Class	Class
11:00-12:00	Wang				Wang
12:00-1:00			Liu		
1:00-2:00			Liu @MTC		Yang
2:00-3:00	Yang @MTC		Liu @MTC		Yang
3:00-4:00	Yang @MTC				
4:00-5:00		D02	D03		
5:00-6:00					
6:00-7:00					
7:30-8:30		Wang (Zoom)			

Syllabus Changes

The instructor reserves the right to make changes to the syllabus, when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.