STAT-S 520 Introduction to Statistics

Instructor Contact Information

Instructor: Jianyu Wang
Contact: Canvas e-mail is my preferred means of contact. I will return your e-mails within 24-48 business hours. In case of emergency only email me at jw257@indiana.edu.
Phone: 812-856-7803
Office: Ballantile Hall 676;
Online meeting space: Zoom
Office Hours: TBA, or by appointment

Prerequisites

- Intermediate algebra skills, such as comfort with functions, logarithms, and college-level mathematical notation;
- Complete a 10-question Self-test before the end of Friday in the first week. If a score of less than 7 is received, please contact the instructor immediately to discuss the risk of taking this course.

Course Description

This course introduces the basic concepts of statistical inference through a careful study of several important procedures. Topics include 1- and 2-sample location problems, the one-way analysis of variance, and simple linear regression. Most assignments involve applying probability models and/or statistical methods to practical situations and/or actual data sets.

Course Website

You will participate in this course using the IU Canvas learning management platform system. Once you are in the platform you can learn how to use Canvas effectively, by clicking the “Help” link on the top right of the course page on Canvas.

Learning Outcomes

At the end of this course, students will be able to

- Characterize uncertainty and variation using probability
- Summarize data using computer graphics and numerical measures of center, spread, and association
- Assess whether observed data fits a probability model and understand the implications for analysis
- Explain what significance probabilities (P-value) and confidence intervals mean, and identify common misinterpretations
• Compare two or more samples or sets of measurements to draw scientific conclusions
• Apply statistical models to real data and recognize their uses and limitations

Course Requirements

Required Text
The required text is Michael Trosset’s *An Introduction to Statistical Inference and Its Applications with R*, 2009, hardback or Kindle. (Yes, "required" means you have to get it: exercises will be assigned from the book. No, the PDF floating around the Internet does not have the correct exercises.) The book's webpage, which includes R functions, data sets, and a list of errata, is here. We recommend that upon purchasing the book, you immediately make the correction listed in the errata.

Technical Requirements
You will need the following in order to participate in this course:

• Computer;
• Reliable internet connection;
• Computer microphone;
• Some way to make and post a simple video (e.g., using a webcam, or a smart phone);
• Open Canvas in a Mozilla Firefox browser
• Software to write up assignments and submit through Canvas as PDFs or word documents;
• Computer software;
  o R: The statistical programming language R is free, open source software available for Windows, Mac OS X, and Linux. You should download and install the base version of R from CRAN in the first week.
  o RStudio: This is a free, open source integrated development environment for R. It will make your work in R much easier and more reproducible. You should download and install the desktop version of RStudio in the first week.

Technical Support
You may also receive support from

• [University Information Technology Services (UITS)](https://its.indiana.edu) (human support)
• [IU Knowledge Base (IUKB)](https://knowledge.iu.edu) (guides)
• [IUware](https://ware.iu.edu) (download free software)

Course Activities and Assignments

• **Discussion** Weekly discussion topics will be assigned.
• **Problem sets** Weekly problem sets will be due on Sundays. All assignments will require you to upload typed answers to Canvas: check the instructions. Late assignments will be penalized; assignments received after answers have been posted will not be graded. If you cannot complete your homework due to illness or incapacity, you must provide documentation from a
medical professional.

• **Midterm 1** The first midterm covers Chapters 1-6 and is scheduled to become available on Thursday February 16th. You will upload typed answers to Canvas. It will be due on Sunday February 19th.

• **Midterm 2** The second midterm covers Chapters 7-13 and is scheduled to become available on Thursday April 6th. You will upload typed answers to Canvas. It will be due on Sunday April 9th.

• **Final Exam** The final exam is comprehensive which covers Chapters 1-15 with an emphasis on Chapters 14-15. It is scheduled to become available on Thursday April 27th. You will upload typed answers to Canvas. It will be due on Tuesday May 2nd.

**Netiquettes (Rules For Online Discussions)**

• Participate: This is a shared learning environment. It is not enough to login and read the discussion thread of others. For the maximum benefit to all, everyone must contribute.

• Read Before Posting: Read everything in the discussion thread before replying. This will help you avoid repeating something someone else has already contributed. Acknowledge the points made with which you agree and suggest alternatives for those with which you don’t.

• Be Clear: Be clear and direct. Stay on point. Don’t lose yourself, or your readers, in overly wordy sentences or paragraphs.

• Use Proper Writing Style: Write as if you were writing a term paper. Correct spelling, grammatical construction and sentence structure are expected in online discussions.

• Cite Sources: If your contribution to the conversation includes the intellectual property (authored material) of others, e.g., books, newspaper, magazine, or journal articles—one online or in print—they must be cited properly.

• Emotions and Texting: Please refrain from :-) faces and c u l8r’s in your posts.

• Respect Diversity: The classroom is an ethnically rich and diverse, multi-cultural place. Refrain from language that is—or could be construed to be—offensive toward others.

• No YELLING! Using bold upper-case letters is like stomping around and yelling at somebody (NOT TO MENTION BEING HARD ON THE EYE).

• No Flaming! Criticism must be constructive, well-meaning, and well-articulated. Tantrums, profanity and rants directed at any other contributors are simply unacceptable.

• Hint: Read your post out loud before hitting the send button. This will help you check whether your grammar, sentence structure, tone, and contribution are appropriate or not.

**Grading Rubric For Online Discussions**

• Students are required to participate in online discussions throughout the course. Discussion topics will reflect the content of the lectures and will be assigned approximately every week (excluding exam weeks). Each discussion is worth 5 points. We expect you to participate in all discussions; however, we understand this may not be possible every week. Because of this, your lowest three discussion scores will be dropped.

• To receive full credit for a discussion, you should either 1) ask a thoughtful question demonstrating that you have completed the module, lectures, and readings, or 2) respond to
TWO of your classmates’ questions or responses in an appropriate, thoughtful manner that accurately and adequately addresses his or her question. You are of course welcome to ask as many questions as you like.

- You must participate before the discussion’s close date. [Note: this excludes the first discussion, where you must provide both an initial post and follow-up responses. See introductory discussion in Module 1 for more information.] Late posts will not be accepted for credit; however, we always welcome questions about the course material at any time.
- Grades will be distributed within a week of the discussion’s close date. Partial credit can be given if the aforementioned criteria are not met in full. Failure to post will result in a score of 0 for that particular discussion.

Overview of the Assignment Grades
The table below provides an overview of how much each assignment is worth and when it is due.

<table>
<thead>
<tr>
<th>Course Assessments</th>
<th>Percentage of Grade</th>
<th>Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>45%</td>
<td>Weekly (Sunday midnight)</td>
</tr>
<tr>
<td>Discussion</td>
<td>5%</td>
<td>Weekly</td>
</tr>
<tr>
<td>Midterm 1</td>
<td>15%</td>
<td>Sunday, Feb 19th</td>
</tr>
<tr>
<td>Midterm 2</td>
<td>15%</td>
<td>Sunday, Apr 9th</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
<td>Tuesday, May 2nd</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
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Grading Scale

97-100% = A+; 93-97% = A; 90-93% = A–;
87-90% = B+; 83-87% = B; 80-83% = B–;
77-80% = C+; 73-77% = C; 70-73%=C–;
67-70% = D+; 63-67% = D; 60-63% = D–; 00-59% = F

University Policies

Accommodations
Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.) You must have established your eligibility for support services through the appropriate office that services students with disabilities. Note that services are confidential, may take time to put into place and are not retroactive; Captions and alternate media for print materials may take three or more weeks to get produced. Please contact
your campus office as soon as possible if accommodations are needed. Find your campus office serving students with disabilities.

Intellectual Dishonesty
All work should be your original product, unless explicitly noted otherwise. Any materials you reference or take from others should be properly cited. Cheating, plagiarism, or fabrication in any form will not be tolerated, regardless of any justification. For more detailed information see the Student Responsibilities section of the Code of Student Rights, Responsibilities, and Conduct. Academic misconduct will not be tolerated. The minimum consequence is failing the assignment. In a case of more serious offense, a student may fail the course. Students should NOT present work from other courses in this class (i.e., using pieces of previous papers you have done is considered plagiarism). I may use the services of Turnitin.com to check for originality of your written work.

Title IX Sexual Misconduct
As your instructor, one of my responsibilities is to help create a safe learning environment on our campus. Title IX and our own Sexual Misconduct policy prohibit sexual misconduct. If you have experienced sexual misconduct, or know someone who has, the University can help. I encourage you to visit Stop Sexual Violence website to learn more. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with a Mental Health Counselor on campus.

It is also important that you know that federal regulations and University policy require me to promptly convey any information about potential sexual misconduct known to me to our Deputy Title IX Coordinator or IU’s Title IX Coordinator. In that event, they will work with a small number of others on campus to ensure that appropriate measures are taken and resources are made available to the student who may have been harmed. Protecting a student’s privacy is of utmost concern, and all involved will only share information with those that need to know to ensure the University can respond and assist.

Code of Student Rights, Responsibilities, and Conduct
Students are expected to adhere to the Code of Student Rights, Responsibilities, and Conduct at all times. Any inappropriate behavior, disruptive conduct (e.g., engaging in hostile or disrespectful commentary on the site, or discussing irrelevant evidence) or non-compliance with faculty directions can result in a charge of Academic and/or Personal Misconduct, the consequence of which could be a variety of sanctions either from the instructor or the Dean of Students. For more information see The Code of Student Rights, Responsibilities, and Conduct.

Course Expectations

Classroom Civility
It is important to build a classroom climate that is welcoming and safe for everyone. Please display respect for everyone in the class. You should avoid racist, sexist, homophobic, or other negative language that may exclude members of our campus and classroom community.
Participation
You should be logging onto Canvas at least three times a week to view assignments, presentations, contribute to discussions, post questions, read posting of others, etc. Activities and assignments will be posted in advance providing ample time for completion. Please plan your schedules accordingly.

Course Absence
If you plan to be absent from class activities for longer periods of time because of a sport, school, medical, or family event, please let me know and complete your work in advance. For a scheduled exam, discussion, or other course events, arrange with me for earlier date. In case you miss these scheduled events, you will receive a zero.

Late Work
A ten percent per day penalty will be applied to late work. Late submission after the solutions are posted will not be graded.

Homeworks are due on Sunday midnight, and solutions will be posted on Tuesday midnight. You can find solutions in Canvas/Files/S520 Problem Sets. Before solutions are posted, late submission are still accepted with 10% off of the points your earn for each day after due date. After solutions are posted, submissions are not accepted. The lowest weekly assignment grade will be dropped at the end of the semester when calculating final grades.

Integrity of a College Student
Students are expected to conduct themselves in a manner befitting their status as a student of a respected and distinguished institution of higher education. In college courses, we are continually engaged with other people’s ideas: we read them in texts, hear them in lecture, discuss them in class, and incorporate them into our own writing. As a result, it is very important that we give credit where it is due. Plagiarism is using others’ ideas and words without clearly acknowledging the source of that information.

See http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml for help in addressing plagiarism in your own work.

Articles and data posted to Canvas for this course are for the convenience of students only and should not be shared outside the course.

Plagiarism
Honesty requires that any ideas or materials taken from another source for either written or oral use must be fully acknowledged. Offering the work of someone else as one’s own is plagiarism. The language or ideas thus taken from another may range from isolated formulas, sentences, or paragraphs to entire articles copied from books, periodicals, speeches, or the writings of other students. The offering of materials assembled or collected by others in the form of projects or collections without acknowledgment also is considered plagiarism. Any student who fails to give credit for ideas or materials taken from another source is guilty of plagiarism.

(Faculty Council, May 2, 1961; University Faculty Council, March 11, 1975; Board of Trustees, July 11, 1975) Source comes from IU's Policies site.
According to the Indiana University Code of Student Rights, Responsibilities, and Conduct (2010), a student must give credit to the originality of others and acknowledge indebtedness whenever:

1. Directly quoting another person’s actual words, whether oral or written;
2. Using another person's ideas, opinions, or theories;
3. Paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
4. Borrowing facts, statistics, or illustrative material; or
5. Offering materials assembled or collected by others in the form of projects or collections without acknowledgement.

Right of Revision
The instructor reserves the right to revise or adjust the course syllabus to best accommodate the pace and needs of the students.

Fair Use Policy
Copying or recording synchronous classes and asynchronous course materials without the express prior approval of Dr. Jianyu Wang is prohibited. All copies and recordings remain the property of Indiana University and Dr. Jianyu Wang. IU and Dr. Jianyu Wang reserve the right to retrieve, inspect, or destroy the copies and recordings after their intended use. These policies are not intended to affect the rights of students with disabilities under applicable law or IU policies.