
The instructor reserves the right to make changes to the syllabus

Instructor

Name: Dr. Hanxiang (Sean) Peng

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Prerequisite MATH 16600 or equivalent (basic differential and integral calculus)

Textbook Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying E. Ye (2016) *Probability and Statistics for Engineers and Scientists*, 9th edition.

Class Time MW 1:30 – 2:45PM

Classroom LD030

Office hours MW 10:30–11:30AM or by appt or via Zoom (ID/Pass 850 0735 8567/446326). Free tutoring for this class is also available at the MAC STAT (<http://mac.iupui.edu/>).

Course summary 3 credits. A data-oriented introduction to the fundamental concepts and methods of applied statistics. The objective is to acquaint the students with the essential ideas and methods of statistical analysis for data in simple settings. In this class students will develop both theoretical and practical skills. Topics include: basic real data analysis using R; simple linear regression; analysis of variance (ANOVA); basic probability theory; random variables; Normal distribution; law of large numbers; Central Limit Theorem; statistical estimation; confidence intervals; hypothesis testing.

Grades

In-class Activities	10 pts \times 20 = 200 pts
Quizzes	20 pts \times 12 = 240 pts
Homework	20 pts \times 12 = 240 pts
Mini R Projects	100 pts \times 2 = 200 pts
Midterm Exam	150 pts
Final Exam	250 pts
Total	1280 pts

Scores in Canvas will be *re-scaled* to match the points given here for course grade calculation. *The letter grades given on Canvas are not based on above and hence not your final grades.*

- **Attendance and Class Participation** Attendance won't be taken. To encourage regularly attending classes and actively participating in class activities, you can earn up to 150 points bonus points.
- **In-Class Activities (ICA)** Each ICA is based on the lecture during which it is handed out, and is submitted via Canvas. The lowest 2 ICA scores will be dropped.

- **Quizzes** Online weekly 30-min quizzes on the MyLab Statistics (MLS) are open each *Monday at 10am and due on the following Monday at 10:00am* and are graded instantaneously, though you will be allowed 2 attempts on each quiz. Each weekly quiz will cover topics taught in the 2 weeks right before the due date. It is recommended that you finish the weekly homework assignment first before starting the corresponding quiz. The lowest 3 quiz scores will be dropped. To access quizzes, go to Canvas → Modules → MyLab Statistics Student Links → MyLab Statistics Quizzes & Tests.
- **Homework** Homework are assigned weekly throughout the semester, covering roughly the material of Chapters 1-13 (excluding Chapters 7 and 12) of the textbook. You will complete these weekly assignments online using MyLab Statistics (MLS) which is bundled with your textbook. Each homework assignment will cover topics taught in the 2 weeks right before the due date. They are open each *Monday at 10am and due on the following Monday at 10:00am* and are graded instantaneously, though you will be allowed 3 attempts on each problem. If for whatever reason you miss Monday's deadline for completing the weekly assignment, you will still be able to access and complete these assignments, but only for 50% credits. This late access to homework will expire by the Final Examination. The lowest 3 HW Scores will be dropped. Note that completing these assignments on time is essential for learning the material and for preparing for the subsequent lectures. These homework assignments are quite lengthy and I recommend that you get an early start on them and do a few problems each day. To access homework, go to Canvas → Modules → MyLab Statistics Student Links → MyLab Statistics Homework.
- **Mini R projects** There will be one **Real Data Analysis Project** and one **Simulation Project** that students complete using the popular free statistical software R. In “real life” no one analyzes data by hand. Therefore, to have a solid background in statistics and data analysis, you should be familiar with a statistical software package. The projects will help you do so. Projects are submitted via Canvas. **No late projects will be accepted.**
- **Exams** There will be **one midterm exam** and **one cumulative final exam**. Exams are closed book, and will have some routine problems as well as some more challenging problems. Review problems will be provided to help you prepare, and you are allowed one page (8.5 × 11, two-sided) of formula sheet for each exam. Cell phone use is not allowed during an exam. All answers should be circled. Please do not use pencil for exams. If pencils are used, the mistakes made by the grader won't be corrected!
- **Grades** Overall course grades will be assigned according to the following rule:

$$A \geq 90\% > B \geq 80\% > C \geq 70\% > D \geq 60\% > F,$$

with “+” and “-” attached for scores falling in the upper and lower third of the range, respectively. I reserve the right to make adjustments to the overall grading policy, but the letter grade cutoffs will be no stricter than those advertised above. Department policy requires that students must pass the final exam to pass the course. Canvas will be used to record scores, but will NOT be used for overall course grade calculation. Hence the overall course grade in Canvas is invalid. Overall course grade will be calculated based on the policy given above.

- **No make up** is allowed for any ICA, quiz, or project. Makeup of the Midterm exam may be given in only a very special (and documented) circumstance, such as: the death of a family member, religious observances, sickness, hospitalization, military duty or the likes. The details for course-wide makeup exam will be given after the Midterm. Those

students who will not be able to take and complete the final exam for similar reasons, may be assigned— if appropriate – an Incomplete grade of I in the course.

- **Incompletes** Grades of Incomplete will only be given in accordance with university policy¹. Specifically, students must be passing at the 3/4 mark of the semester to qualify for assigning an incomplete. The instructor must agree that an incomplete is appropriate and it must be approved by the Associate Chair of the Department of Mathematical Sciences.

Software and Calculator This course uses the R statistical software. This software is available on all university PCs or through IUANYWARE, but you can download it for your own computer since it is open source and free. Here is the link for R: <https://www.r-project.org/>, where you can find R availability, online help, and other info. No previous R experience is assumed—online tutorials are available by searching in Google or Youtube. RStudio (<https://www.rstudio.com/>) is the powerful and productive user interface for R, which is also free and open source. **Throughout this course, we will use calculator TI84. And everyone needs to have it.**

Points of interest Remarks to help answer some questions you may have.

- Course announcements and grades will be posted on **Canvas**. All course materials including lecture slides, project data, R demo codes, chapter summaries are available at Canvas → Files.
- To access your text book, quizzes (on MyLab Statistics), and homework (on MyLab Statistics) through Canvas, please see registration instructions at the end of syllabus.
- Under Canvas → Modules → MyLab Statistics Student Links, you can click “MyLab Statistics Browser Check” to check browser and plug-ins, click “Integration Support” if there are any technique issues, and click “MyLab Statistics Pearson eText” to access e-text book.
- All assignments are submitted through canvas. Do not wait till the last minute before deadline as technical problems may happen.
- Please submit a **single PDF file** for each assignment. Adobe Scan or CamScanner may be used to scan your handwritten work into a single PDF file before uploading. wait for the correct answers so that you can compare them to your answers. If you still have questions **AFTER** the comparison please contact the instructor. If you contact the instructor before the correct answers become available then you will be asked to wait for the correct answers.
- You have no reason to be in contact with the grader for this course. If you have questions about the grading, please speak with your instructor about it.
- You may discuss HW/project problem with your classmates, but you must write up and submit solutions independently.

a request for withdrawal after the **Nov. 15** deadline requires extremely serious and documentable excuse and is rarely granted by the university. Withdrawal schedule is given below²:

¹See <https://studentcentral.iupui.edu/grades-progress/incompletes.html>

²See <http://registrar.iupui.edu/enrollment/4118/cal4118.html>

Accommodations³ Students needing accommodations because of a disability will need to register with Adaptive Educational Services (AES) and complete the appropriate forms issued by AES before accommodations will be given. The AES office is located in Taylor Hall, UC 100. You can also reach the office by calling 274-3241.

Dishonesty and Student Misconduct Cheating will result in a minimum penalty of receiving a grade of F in the course. The IUPUI Department of Mathematical Sciences expects all students to adhere to the regulations put forth in the “IUPUI Code of Student Rights, Responsibilities, and Conduct” concerning academic misconduct or personal misconduct. Procedures for imposing academic and disciplinary sanctions are outlined in the Code⁴.

Campus Wide Policies Governing the Conduct of Courses at IUPUI⁵ There are links to specific policies in the general areas of attendance, academic policy, conduct and related policies.

Administrative Withdrawal. A basic requirement of this course is that you will participate in all class meetings and conscientiously complete all required course activities and/or assignments. Keep in touch with me if you are unable to attend, participate, or complete an assignment on time. If you miss more than half of the required activities within the first 25% of the course without contacting me, you may be administratively withdrawn from this course. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and if you are administratively withdrawn from the course you will not be eligible for a tuition refund.

Withdrawals If you decide to withdraw from the course, be sure to process all paperwork by the appropriate deadlines outlined in the following table⁶:

Times	Signatures Required
First Week	None
After First Week	Advisor
1/2 mark of Semester	Advisor and Instructor
3/4 mark of Semester	Associate Chair, LD 270

After the 3/4 mark of the semester, course instructors cannot sign a drop slip. The student must see the Associate Chair of the Department of Mathematical Sciences. The School of Science Dean’s Office will not endorse a withdrawal after the 3/4 mark of the semester for students unless an extremely serious and documentable excuse is established.

IUPUI acknowledges our location on the traditional and ancestral territory of the Miami, Potawatomi and Shawnee people. We honor the heritage of Native peoples, what they teach us about the stewardship of the earth and their continuing efforts today to protect the planet. Founded in 1969, IUPUI stands on the historic homelands of Native peoples and, more recently, that of a vibrant Black community, also displaced. As the present stewards of the land, we honor them all as we live, work and study at IUPUI.

³See <http://aes.iupui.edu/> for more information

⁴See <http://studentcode.iu.edu/index.html>

⁵See <https://studentcentral.iupui.edu/register/index.html>

⁶Official details can be found at <https://studentcentral.iupui.edu/calendars/official-calendar.html>

Every attempt will be made to accommodate qualified students with disabilities (e.g., mental health, learning, chronic health, mobility, hearing, vision, neurological, etc.). You must have established your eligibility for support services through the appropriate office that serves 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 office at <https://accessibility.iu.edu/ada/requesting-accommodations/for-students/index.html>

Table 1: **Schedule** (The instructor reserves the right to make changes without notice)

Week	Date	Day	Due	Contents	Readings
01	01/08	M		Introduction; data; Intro to R	1.1,1.2,1.5
	01/10	W	ICA1	Numerical summaries of data; I1	1.3,1.4
02	01/17	W	ICA2, HW1, Q1	Graphical summaries of data; I2	1.6
	01/22	M	ICA3, Extra	Regression, Explain P1; I3	11.1–11.3
03	01/24	W		Catch up	
	01/29	M	HW2, Q2	R Demonstration (1,2)	
04	01/31	W	ICA4	Probability axioms; applications; I4	2.1,2.2,2.4
	02/05	M	ICA5, HW3, Q3	Counting methods; properties; I5	2.3,2.5
05	02/07	W	ICA6,	Conditional probability; I6	2.6
	02/12	M	ICA7	Total prob; Bayes theorem; indep; I7	2.7
06	02/14	W	ICA8, HW4, Q4	Random variables; CDFs; PMF; I8	3.1,3.2
	02/19	M	ICA9	PDF; I9	3.3
07	02/21	W	ICA10, HW5, Q5	Expected value; Variance; ind RVs; I10	4.1–4.3
	02/26	M	ICA11	Binomial;Hypergeometric;Poisson;I11	5.1–5.3,5.5
08	02/28	W	ICA12, HW6, Q6, HW7, Q7	Uniform; Exponential; I12	6.1,6.6
	03/04	M	ICA13	Normal random variables; I13	6.2–6.4
09	03/06	W	HW8, Q8	Review for Midterm Exam	
	03/18	M		Midterm Exam	
10	03/20	W	P1	R for sampling; Sampling distn;	8.1–8.3
	03/25	M	ICA14	CLT; I14	8.4
11	03/27	W	ICA15	More CLT exercises; t-distn; I15	8.4, 8.6
	04/01	M	ICA16, HW9, Q9	Confidence intervals for a mean; I16	9.1–9.5
12	04/03	W	ICA17	More CI's for a mean; I17	9.5
	04/08	M	ICA18, HW10, Q10	Two-sample CIs; I18	9.8–9.11
13	04/10	W	ICA19, HW11, Q11	Hypothesis tests for a mean; I19	10.1–10.4
	04/15	M		Power problem	10.1–10.4
14	04/17	W	ICA20, HW12, Q12	p-value; T tests; CI for test; I20	10.6,10.8
	04/22	M	ICA21, P2	Z test for prop; Two-sample tests; I21	10.5,10.9
15	04/24	W	ICA22, HW13, Q13	ANOVA & Regression; I22	11.4,11.5,13.1
	04/29	M		Review for Final Exam	
	05/01	M		Final Exam: 1:00PM – 3:00PM	
				In the same classroom	
	05/03	M	HW14-15, Q14-15		