

## STAT417

### Statistical Theory (3 credits)

Dr. Qifan Song, Math 208  
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**Lectures Time:**

MWF 2:30 pm - 3:20 pm (CRN 17016 - STAT 417 - DM)

**Classroom:** SC 239

**Virtual Office hours:** M 09:30-10:20 am (<http://purdue.webex.com/meet/qfsong>) or by appointment.

**TA:** Wei Hao ([haow@purdue.edu](mailto:haow@purdue.edu))

Virtual Office Hours: F 04:00-05:00 pm (<https://meetingsamer31.webex.com/meet/pr1266433470>)

**Course Description and Learning Outcomes:**

This course is an introduction to the mathematical theory of statistical inference, emphasizing inferences for standard parametric families of distributions. The covered topics in this course include: Properties of estimators; Bayes and maximum likelihood estimation; Sufficient statistics; Properties of test of hypotheses; Distribution theory for common statistics based on normal distributions. After this course, students shall gain principle understandings for mathematical statistics and are able to perform proper statistical inferences for basic parametric models.

**Prerequisites:**

STAT 416 or an equivalent course.

**Texts/references:**

Probability and Statistics: The Science of Uncertainty (Second Edition) by Michael J. Evans, and Jeffrey S. Rosenthal. You can find the full text of this book online at <http://www.utstat.toronto.edu/mikevans/jeffrosenthal/book.pdf>. Errata for the text book is available at <http://www.utstat.utoronto.ca/mikevans/mathstat2/book.html>.

**Course website:**

All teaching materials, announcements, homework will be posted on Brightspace website <http://purdue.brightspace.com>.

**Accommodation for Covid-19:**

Due to the ongoing COVID-19 pandemic, the instructor intends to avoid any close physical contact with students as much as possible. All students must wear mask properly (i.e., covering

both mouse and nose), and obey social distance requirement. Therefore, all office hours will be hold virtually. An instruction of how to join the virtual office hour via webex is posted in the course website. All homework shall be submitted through Brightspace electronically. In-class videos will be capture by Boilercast system and uploaded to Brightspace website. Note that the Boilercast is operated and maintained by Itap and the instructor doesn't have full responsibility for the video quality. The midterm and final exams **may** be virtual as well, a further announcement about the arrangement of exams will be given later. Depending on the local COVID-19 spread situation and the instructor's health condition, these policies may change to regular face-to-face office hour and exams, or even be canceled upon university's approval.

**Grading Rule:**

Assignments (all assignments have equal weight): 30%; Midterm Exam: 35%; Final Exam: 35%. The percentage grades needed to achieve an A, B, C, or F will follow approximately the following scale: 90 – 100 = A, 80 – 89 = B, 70 – 79 = C, 60 – 69 = D, below 60 is F. The instructor reserves the right to change the rule of letter grade assignment and assign “+” or “-” letter grades.

**Examinations:**

**Midterm Exam:** 2:30 pm - 3:20 pm on March 10th, SC 239. In principle, all students must come to the campus for the midterm. The allowed exceptions are:

- Students who are under COVID quarantine/isolation and are not allowed to enter campus. Those students will attend the exam virtually during the SAME exam time. Further instruction on exam delivery and submission will be posted later. Those students must send request to Dr. Song before the exam date and provide proof that s/he is and will still be under quarantine/isolation on the exam date.
- Students who registered with DRC can take the exam at DRC facility. Those students must contact Dr. Song asap to discuss the exam time and submit a DRC test request at <https://www.purdue.edu/drc/testing/requesting-an-exam.php> before March 3.
- Students who have schedule conflict may take the exam at a different time upon Dr. Song's approval. Acceptable excuses include Grief, Military, Jury Duty Absences and etc. Those students must contact Dr. Song asap, and provide necessary proof.
- Students who have medical conditions, e.g., is hospitalized due to COVID-19 or have a medical emergency on the exam date, may take a virtual exam at a different time upon Dr. Song's approval. Those students must contact Dr. Song asap with proper doctor's note.

Students, who are eligible for the above exceptions, but fail to contact Dr. Song properly and don't attend the in-person midterm exam, will be considered absent from the midterm and receive 0 pt for the midterm.

**Final Exam:** During May 3-8th

**Attendance, Homework, Exam policy:**

- Class attendance is an important part of your success in the class. The syllabus, homework assignments, exam dates, etc. may be changed by in-class announcements. The posted teaching videos are meant to help the students who are quarantined due to COVID-19, but not to encourage absence from classroom. Low attendance without proper excuses may cause penalty to the final grade.
- The homework will be assigned approximately one week before its due date and will also be posted on the class website. The homework must be finished (written) independently. Discussion is okay, but identical copies are not acceptable since your homework must reflect YOUR understanding of the material. If identical solutions are found, all the parties involved will receive a 0 on that assignment. Homework shall be submitted directly on the course website.
- No late assignments will be graded. To allow for illness, family emergencies, etc., the lowest homework scores will be dropped at the end of the fall semester.
- A makeup examination will be only given to the students who could provide satisfactory evidence that the absences are due to some causes beyond their control (e.g., Grief, Military, and Jury Duty Absences). Contact me as soon as possible if you are unable to take an exam at the scheduled time. It is STUDENT'S responsibility to contact me IN ADVANCE to check if a make-up is possible. I will not accept the request of make-up exam AFTER the exam time with non-emergency excuses.

**ADA, Plagiarism, Academic Integrity and Nondiscrimination Statement:**

- STATEMENT ON DISABILITIES: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation for their disabilities.

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome

to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center (DRC) at: [drc@purdue.edu](mailto:drc@purdue.edu) or by phone: 765-494-124. If you have registered with DRC and have an Accommodation Letter from DRC, or you are in need of academic accommodations, please contact me as soon as possible.

- **STATEMENT ON PLAGIARISM:** The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission. As commonly defined, plagiarism consists of passing off as one's own ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

- **ACADEMIC INTEGRITY STATEMENT:**

Academic integrity is one of the highest values that Purdue University holds. Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, University Regulations] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972].

Individuals are encouraged to alert university officials to potential breaches of this value by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

The Purdue Honor Pledge "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue".

Any confirmed academic misconduct activity in this course leads to punitive grading.

- **NONDISCRIMINATION STATEMENT:** Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.
- **VIOLENT BEHAVIOR POLICY:** Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activities.
- **EMERGENCY PREPARATION:** In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructors control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

Guidelines regarding ensuring access to emergency information:

- Keep your cell phone on to receive a Purdue ALERT text message
- Log into a Purdue computer connected to the network to receive any Desktop Popup Alerts
- If you have a no cell phone in class policy allow one or two students who have signed up for Purdue ALERT to keep their phones on to receive any alerts