Syllabus for Math 372: Elementary Probability and Statistics

Fall 2026

Instructor: Max Hill
Office: Physical Sciences Building 304
Office Hours: 2:00-3:00pm Monday and Wednesday (or other times by appointment).
Course website: `https://max-hill.github.io/math-372-F26/`

Place and time: Web 103 at 10:30-11:20am (MWF)

Textbook: *Probability and Statistics for Engineering and the Sciences* by Jay L. Devore (9th edition). ISBN-13: `978-1-305-25180-9`

Course prerequistes: Math 216 or Math 242 or Math 252A. If you don't meet the prerequisites, you'll need to get approval from the math department office.

Exams: There will be two midterms and a final exam. The final will be cumulative, but will emphasize material after the midterm. The exam dates are as follows:

Midterm 1 ..... Friday, September 25 (in class)
Midterm 2 ..... Tentative date: Friday, October 23 (in class)
Final exam ..... Friday, December 18 at 9:45-11:45am

Grading: Homework (10%), Quizzes (20%), Midterm 1 (20%), Midterm 2 (20%), Final (30%).
The following grade cutoffs will be used at the end of the semester to determine final grades:

D	D+	C-	C	C+	B-	B	B+	A-	A	A+
60%	67%	70%	73%	77%	80%	83%	87%	90%	93%	97%

Homework and quizzes: Homeworks and quizzes will be approximately weekly. Homework grade includes in-class worksheets.

- Homework is graded on completion. You may use any resources, but need to write your solution up yourself to recieve credit. Late homework will not be accepted.
- Quizzes will be based on homeworks.
- You have one free 'no questions asked' quiz retake (in case you miss a quiz or do poorly on it). You don't need to schedule this ahead of time, but can do this in office hours.

Make-up policy: With the exception of the one 'no questions asked' quiz retake, make-up quizzes and exams are allowed only in three types of circumstances: (1) in accordance with university policies, such as conflict with a religious observation, (2) conflicts with another university-related event, or (3) exceptional circumstances, such as a last-minute medical or family emergency with verification. In the first two cases, notice must be given to the instructor two weeks in advance.

Incompletes: An incomplete is possible only if all of the following apply: (1) you have a compelling personal reason, e.g., serious illness or accident (a proof, e.g., report from a doctor or police must be shown); (2) your work so far would receive a passing grade; and (3) there is a good chance you will complete the course with a passing grade within the allotted time. Thus, expecting to fail the class is not a reason to ask for an incomplete.

Accommodations: Any student who feels s/he may need an accommodation based on the impact of a disability is invited to contact me privately. I would be happy to work with you, and the KOKUA Program (Office for Students with Disabilities) to ensure reasonable accommodations in my course. KOKUA can be reached at (808) 956-7511 or (808) 956-7612 (voice/text) in Room 013 of the Queen Lili'uokalani Center for Student Services.

Tentative course outline: This course is a problem-oriented introduction to the basic concepts of probability and statistics, providing a foundation for applications and further study.

- **Weeks 1-3:** Introduction to probability theory
  - Experiments, events, sets, probabilities, random variables. Equally likely outcomes, counting techniques. Conditional probability. Independence. Bayes' theorem. (Sections: 2.1-2.5)
- **Weeks 4-5:** Discrete random variables (1.5 weeks)
  - Expected values, mean, variance, binomial distribution, Poisson distribution. Moment generating functions. (Sections: 3.1-3.6)
- **End of week 5: Midterm 1 (Friday, September 25)**
- **Weeks 6-7:** Continuous Random variables (1.5 weeks)
  - Uniform, exponential, gamma, and normal distributions. Intuitive treatment of the Poisson process and development of the relationship with gamma distributions. (Sections: 4.1-4.4)
- **Weeks 8-9:** Multivariate distributions
  - Calculation of probability, covariance, correlation, marginals, conditions. Distributions of sums of random variables and sampling distributions. Central limit theorem. (Sections: 1.1, 1.3, 1.4, 5.1-5.7)
- **End of week 9: Midterm 2 (Tentatively: Friday, October 23)**
- **Week 10:** Introduction to statistical estimation
  - Point and confidence interval estimation. Maximum likelihood, optimal, and unbiased estimators. Examples. (Sections 6.1, 6.2)
- **Weeks 11-12:** Large sample inference
  - Estimation (1.5 weeks): Types and comparison of estimators; sampling distributions for means/proportions, and their use in large sample estimation; sample size. (Sections 7.1, 7.2)
  - Hypothesis testing (1.5 weeks): Components of a test; signficance and power; p-values; large-sample tests for means and proportions (Sections: 8.1-8.4)
- **Week 13:** Small sample inference
  - t-distribution, with applications to small sample estimation and testing; χ^2 and F distributions, with applications to inference about variances (Sections: 7.3, 7.4, 8.3)
- **Weeks 14-16:** Regression and χ^2 tests
  - Regression (1.5 weeks): Least squares, correlation coefficient, inference (Sections: 12.1-12.5)
  - χ^2 tests: multinomial dsitributions, contingency tables, goodness-of-fit (Sections: 14.1-14.3)
- **Last day of instruction: Wednesday, December 9**
- **Final Exam: December 18**