

New Course!
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# Statistics 340

## Introduction to Probability & Mathematical Statistics – I

(first course in sequence Stat 340, 341, 342)

STAT 340 is the new initial course in a core sequence for majors & minors in Statistics and in the ACMS Statistics pathway. For these students, STAT 340 replaces STAT/MATH 394-395 in building the probability background leading into mathematical statistics. STAT 340, 341 & 342, together form a 3-course sequence (Aut-Win-Spr) that provides a strong coherent foundation in probability & mathematical statistics, for further study in probability and/or statistical methods. All three quarters interweave statistics and probability. Stat 340 emphasizes probability concepts, Stat 342 emphasizes statistical concepts.

### Purpose and course content:

The study of **probability** gives us both theory and tools to model many aspects of the way our world works. In addition, probability works in synergy with **statistical theory and methods** to allow us to construct and assess our probabilistic models and to build even further our understandings. Students will gain proficiency and understanding of the use of probability and statistical models and methods.

The primary **intended audience** is students majoring in statistics, ACMS, mathematics or mathematics teaching.

### Topics:

**Probability:** probability axioms, combinatorics, conditional probability, independence, random variables, joint and conditional distributions, binomial and Poisson processes, univariate and multivariate distributions and densities, and moments; binomial, negative binomial, geometric, Poisson, normal, exponential distributions, and central limit theorem.

**Statistics:** basic estimation and hypothesis testing theory - derivations and properties of estimators, bias, mean squared error, efficiency, consistency, sufficient statistics, maximum likelihood & method of moments estimators, confidence intervals; hypothesis testing - derivations and properties, power, likelihood ratio tests; data from non-simple random samples; introduction to the theory underlying regression modeling and inference.

**Time:** Mon. & Wed. 11:30-12:20, and Fri. 11:30-1:20

**Place:** check the UW Time Schedule

**Instructor:** Prof. Elizabeth Thompson (eathomp@u.washington.edu)

**Office:** C-317 Padelford Hall

### Prerequisites:

- an introductory statistics course such as Stat 220, 311, or 390
- a year of calculus, equivalent to Math 124, 125 and 126 (basics of differentiation, integration and series)

### Textbooks:

Kelly, **Introduction to Probability**, Macmillan. Required for 340.

Larsen and Marx, **An Introduction to Mathematical Statistics and its Applications**, 4th edition, Prentice-Hall, 2006. Recommended for 340, required for 341 & 342.

