

# Advanced introduction to probability

MATH 340 / Stat 231 — Spring 2018  
T Th 4:40-5:55 in Physics 259

**Instructor:** Matthew Junge

**Office:** Physics 106

**Email:** jungem@math.duke.edu

**Course Website** [www.mathjunge.com/teaching/340](http://www.mathjunge.com/teaching/340)

**Office Hours:** M W 3:00–4:00pm in Physics 106.

**Textbook:** *Elementary probability theory for applications*. We will use a beta version that is available for download through the course sakai website. Additional notes will be provided for the section on branching processes.

**Homework:** There are eight. One for each section. Homework is worth 10% of your grade, and is collected in class.

**Exams:** Midterms are each worth 25% of your grade. The final is worth 40% and is cumulative. It will be a take-home final due on Saturday 5/5 at 10pm.

§1: **Combinatorial probability:** 3 lectures

§2: **Independence:** 2.5 lectures

§3: **Random variables:** 3.5 lectures

§4: **Mean and variance:** 3.5 lectures

§5: **Central limit theorem:** 2 lectures

§6: **Conditional probability:** 3 lectures

§\*: **Branching processes:** 2 lectures

§7: **Markov chains:** 4 lectures

**Exam rules:** You may bring one side of a single handwritten 8.5 x 11 inch sheet of notes. Calculators and other electronic devices are not permitted.

**MAPs:** *Matt Approved Problems*<sup>TM</sup> are exam-like problems circulated before each exam. They are not worth points, but illustrate what to expect.

WK	TUE	THU
1		1/11 1.1, 1.2
2	1/16 1.2, 1.3	1/18 1.3, 1.4
3	1/23 <b>HW1</b> 2.1, 2.2	1/25 2.3, 2.4
4	1/30 2.4, 3.1	2/1 3.1, 3.2
5	2/6 <b>HW2</b> 3.3, 3.4	2/8 3.4
6	2/13 Review	2/15 <b>Midterm 1</b> <b>HW3</b>
7	2/20 4.1, 4.2	2/22 4.2, 4.3
8	2/27 4.4, 4.5	3/1 4.5, 5.1
9	3/6 <b>HW4</b> 5.1, 5.2	3/8 5.3, 6.1
	spring break	spring break
10	3/20 6.1, 6.2	3/22 6.2, 6.3 <b>HW5</b>
11	3/27 6.3, 6.4	3/29 Review
12	4/3 <b>HW6</b> <b>Midterm 2</b>	4/5 Branching
13	4/10 Branching	4/12 7.1, 7.2
14	4/17 7.3	4/19 7.4 <b>HW7</b>
15	4/24 7.5, 7.6	
16	<b>HW8 (Tuesday)</b>	<b>SAT 5/5 by 10PM TAKEHOME FINAL</b>