

15.079/15.0791 Introduction to Applied Probability  
Fall 2016

*Instructors:*

|                   |         |         |  |
|-------------------|---------|---------|--|
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*Teaching Assistant:*

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*Course Objectives:*

- To gain a real understanding of the laws of Probability and their many consequences
- To progress towards describing real-world uncertainty with probabilistic models and then using those models for practical purposes

*Textbook:*

The course textbook is *Applied Probability: Models and Intuition* by Barnett, and is available at the MIT Coop. Because he has no desire to benefit financially from sales to his students, Barnett will donate all his royalties to an MIT Scholarship Fund.

*Exams:*

There will be two in-class quizzes and a full-length final exam during the scheduled exam period. All exams will be open-book, open-notes and open-web.

*Homework:*

There will be nine assignments of moderate length, roughly one per week. They will provide opportunities to use probabilistic ideas (as opposed to watching the instructors use them).

*Some Further Details:*

Every evening when we have class, the Professor will send an e-mail to the class discussing what was accomplished (or not accomplished) that day. The message will indicate what topics and problems were discussed, and which are likely to be discussed in the next lecture. There will also be one-on-one office hours, recitations, and electronic office hours day and night. Welcome aboard.

OVER

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 Syllabus

NOTE: Schedules are based on expected flying times. Safety is our primary consideration. Because weather and other factors might affect operating conditions, arrivals and departures cannot be guaranteed.

--Emergency Card, Trans World Airlines (RIP)

| <u>Lecture</u> | <u>Topic</u>                                | <u>Book Chapter</u> | <u>Deliverable</u> |
|----------------|---|---------------------|--------------------|
| 9/7            | Laws of Probability                         | 1                   |                    |
| 9/12           | Games of Chance                             | 1                   |                    |
| 9/14           | Health and Safety                           | 1                   |                    |
| 9/19           | Still More Applications                     | 1                   | HW 1               |
| 9/21           | Discrete Probability Distributions          | 2                   |                    |
| 9/26           | Binomial Processes of Note                  | 2                   | HW 2               |
| 10/3           | Geometric/Hypergeometric                    | 2                   |                    |
| 10/5           | Poisson Processes                           | 2                   | HW 3               |
| 10/12          | Continuous Random Variables                 | 3                   |                    |
| 10/17          | Uniformity and Memorylessness               | 3                   | HW 4               |
| 10/19          | First Quiz                                  |                     | Insight            |
| 10/24          | To Be Normal                                | 3                   |                    |
| 10/26          | Sums of Independent Random Variables        | 4                   |                    |
| 10/31          | The Big Bang: The Central Limit Theorem     | 4                   | HW 5               |
| 11/2           | Correlation and Its Consequences            | 4                   |                    |
| 11/7           | Simple Probability Models                   | Notes               | HW 6               |
| 11/9           | More Simple Models                          | Notes               |                    |
| 11/14          | Generating Functions                        | 4                   | HW 7               |
| 11/16          | Derived Distributions                       | Notes               |                    |
| 11/21          | Second Quiz                                 |                     | More Insight       |
| 11/23          | Applications of the Central Limit Theorem   | 4                   |                    |
| 11/28          | Markov Processes                            | Notes               | HW 8               |
| 11/30          | More Markov Processes                       | Notes               |                    |
| 12/5           | Pedestrian Crossing Problem                 |                     |                    |
| 12/7           | Simulation and Probability                  | 3                   | HW 9               |
| 12/12          | Statistics as an Application of Probability | Notes               |                    |
| 12/14          | Further Probabilistic Ventures              |                     |                    |
|                | Final Exam                                  |                     | Accumulated Wisdom |