

# Math 382: Probability and Statistics

## Fall 2011

**Instructor:** Dr. Oleg Makhnin

**Office:** Weir 223

**Office Hours:**

M 9 - 10:30 am TR 8:30-9:20 am, 2-3 pm F 2-3 pm  
or by appointment

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**Textbook:** *Lecture Notes by Hossain and Makhnin*  
available from Math Department

**Objectives:**

1. To learn ideas of probability
2. To learn basic concepts and applications of statistical inference
3. To learn how to construct and apply probability models in science and engineering

**Pre-requisites:** Calculus II, some knowledge of set algebra (review)

### COURSE POLICY

1. Grading is based on
  - (a) Homework and quizzes
  - (b) Two exams, which will be announced at least one week ahead of time
  - (c) Comprehensive final exam

Your grade is based on the percentage of total points earned (the individual tests and homework are **not** assigned a letter grade).

2. Regular homework is important! Homework is due by the beginning of class. NO LATE homework is accepted but the lowest 2 homework grades will be excluded.
3. In order to make up any assignment, a valid excuse should be documented. The instructor decides if an excuse is a valid one.
4. For advanced students, the sets of “challenge exercises” will be available. Completed challenge exercises, together with excellent class record, may lead to the waiver of the final exam.

**Distribution of Scores (tentative):**

Tests: 200 pts. Homework and quizzes: 150 pts. Final: 150 pts.

## Grading scale (tentative):

A above 90% B 80-90% C 70-80% D 60-70% F below 60%  
Plusses and minuses will be given

## Topics (tentative):

Week	T	R
1	2.1, 2.2 Probability: intro, review of set notation <a href="#">Hw1</a>	2.3-2.5 Probability rules, counting. <a href="#">Hw2</a>
2	2.6 Conditional probability, independence <a href="#">Hw3</a>	2.7 Bayes rule <a href="#">Hw4</a>
3	3.1 Discrete RV <a href="#">Hw5</a>	3.2 Expected values <a href="#">Hw6</a>
4	3.3, 3.4 Binomial <a href="#">Hw7</a>	3.5, 3.6 Geometric, Negative Binomial <a href="#">Hw8</a>
5	3.7 Poisson <a href="#">Hw9</a>	3.8 Hypergeometric <a href="#">Hw10</a>
6	3.9 Moment Generating Functions, Review	Exam 1
7	4.1 Continuous RV's <a href="#">Hw11</a>	4.2 Expected values, 4.3 Uniform <a href="#">Hw12</a>
8	4.4, 4.5 Exponential, Gamma <a href="#">Hw13</a>	4.6 Normal <a href="#">Hw14</a>
9	4.7 Weibull <a href="#">Hw15</a>	5.1 Bivariate distributions <a href="#">Hw16</a>
10	5.2-5.4 Conditional distributions; Covariance and correlation <a href="#">Hw17</a>	6.1, 6.2 Functions of RV's, CDF method <a href="#">Hw18</a>
11	6.3, 6.4 Transform method, CLT <a href="#">Hw19</a>	Review
12	Exam 2	7 Descriptive stats <a href="#">Hw20</a>
13	8.1, 8.2 Confidence intervals <a href="#">Hw21</a>	8.3, 8.4 Hypothesis testing <a href="#">Hw22</a>
14	8.5 Two means, 8.6 proportions <a href="#">Hw23</a>	---
15	9.1, 9.2 Regression <a href="#">Hw24</a>	9.3 Regression <a href="#">Hw25</a>
16	Chi-square testing <a href="#">Hw26</a>	Final review

## Advice

Like most math courses, this course is cumulative. For this reason, try not to fall behind. Any difficulties must be resolved quickly. You can get help from your instructor, or go to the Help Room (Weir 220). Regular class attendance, taking notes and participating in class discussions are expected.