Abstract

The purpose of this relatively new EE364 course (developed in 1998) is to expose Electrical Engineering students to uncertain phenomena during Junior year. The distinguishing feature between EE464 and EE364 is that the latter course deals with probability AND STATISTICS, while the former course deals with probability only.

Instructor

Dr. Edmond A. Jonckheere

Office: Hughes Aircraft Electrical Engineering Building, EEB306,
Telephone: (213) 740-4457,
E-mail address: jonckhee@usc.edu,
Office hours: Tu.-Th., 1:00-3:00 p.m.

Teaching Assistant

Marios Lestas, Research Assistant

Office: Hughes Aircraft Electrical Engineering Building, EEB 316,
E-mail address: lestas@usc.edu,
Telephone: (213) 740-2351,
Office hours: Monday and Thursday: 4:00-5:30 in EEB 316
Grader

Reza Motaghian, Research Assistant
Optical Communications Laboratory
Dept. of Electrical Engineering
University of Southern California
Los Angeles, CA 90089-2565

Telephone: (213) 740-1488
Fax: (213) 740-8729
E-mail: motaghia@usc.edu
Web page: http://oclab.usc.edu
Office hours: Wed. 11-13
Office: B20-B22 (EEB Basement) or 524

Textbook (Required)


Additional (Recommended) Readings

- M. G. Bulmer, Principles of Statistics, Dover, 1979. (Highly recommended, very crisp exposition of the fundamental principles of statistics; will follow this book in the last four parts of the course description; interestingly, the textbook seems to be inspired from this one-the notation in particular is consistent with that of the textbook!)

Prerequisites

- Differential and Integral Calculus.
- Combinatorial Analysis (permutations, binomial coefficients, etc.).
- Set Theory (union, intersection, Venn diagrams, etc.).
**Course description**

The course will roughly follow the textbook by Walpole, Myers, Myers and Ye. (The departures from the text are written between parentheses in the course description here below.) Some additional notes covering the additional topics not in the text will be distributed in due course.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapters</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Introduction to data analysis, statistics, and probability (including binomial law and the De Moivre-Laplace formula)</td>
<td>Chap. 1, 2</td>
<td>January 2003</td>
</tr>
<tr>
<td>Random variables, probability distributions, and mathematical expectation</td>
<td>Chap. 3, 4</td>
<td>January-February 2003</td>
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<tr>
<td>Some combinatorial probability laws (e.g., Poisson distribution as the statistics of &quot;rare events,&quot; e.g., aircraft accidents)</td>
<td>Chap. 5</td>
<td>February 2003</td>
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<tr>
<td>Some continuous probability laws, e.g., Gauss distribution (including Maxwell-Boltzmann distribution)</td>
<td>Chap. 6</td>
<td>February-March 2003</td>
</tr>
<tr>
<td>Change of random variables and functions of random variables (including convolution theorem, moment generating function, and central limit theorem)</td>
<td>Chap. 7</td>
<td>March 2003</td>
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<tr>
<td>Fundamental sampling distributions: distribution of mean, distribution of variance; ( \chi^2 ), ( t ), and ( F ) distributions (including landmark experiment in Great Britain on the distribution of the heights of inmates which historically led to the ( \chi^2 ) distribution of the variance.)</td>
<td>Chap. 8</td>
<td>April 2003</td>
</tr>
<tr>
<td>Statistical inference, confidence interval (only the <strong>most fundamental</strong> concepts will be covered)</td>
<td>Chap. 9</td>
<td>April 2003</td>
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<tr>
<td>Hypothesis testing (only the <strong>most fundamental</strong> concepts will be covered)</td>
<td>Chap. 10</td>
<td>April 2003</td>
</tr>
<tr>
<td>Linear regression and estimation</td>
<td>Chap. 11, 12</td>
<td>April-May 2003</td>
</tr>
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**Format**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>homework (one per week, assigned on Th., due the following Th.)</td>
<td>20%</td>
</tr>
<tr>
<td>midterm</td>
<td>30%</td>
</tr>
<tr>
<td>final</td>
<td>50%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
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</tbody>
</table>

**Note:** Midterm and final exams will be open books, open notes exams, subject to the following restrictions:
- The only book allowed will be the textbook by Walpole, Myers, Myers and Ye.
- Handouts, student’s graded homework, and homework solutions drafted by grader will be allowed
- Student’s *personal, handwritten* notes will be allowed.