EE 381 Class Syllabus

Course: Probability, Statistics, and Random Processes for Computer Science Majors

Section 06 - 7743 seminar: MW 2:00 p.m. - 2:50 p.m., ECS 317

Section 07 - 7744 laboratory: MW 3:00 p.m. - 4:15 p.m., ECS 317

Lecturer: de Sulima-Przyborowski

Office Location: ECS 528

Office Hours: 8:00 a.m. - 8:15 a.m. M/W and 9:00 a.m. - 9:30 a.m. T

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Text(s): See the list under the heading “Texts” below.

Each lecture will begin with the students having the opportunity to ask reasonable questions about topics discussed in the most recent lectures. A student taking this course is expected to have a working knowledge of discrete mathematics, calculus, and the computer language Python. There will be approximately six in class quizzes worth ten points each. Any practice materials for the in class quizzes will not be collected. There will be approximately six computer projects worth five points each. Late lab projects lose one point for every week they are late. The midterm exam and the final exam are worth 50 points each. Both the midterm and final exam may include a practicum. All in class quizzes and exams are closed book and closed notes. There are no “make-ups” for missed quizzes or exams. **There will not be practice exams**. There will be approximately five on-line quizzes. The on-line quizzes are both provided to reinforce the basic mathematics the student is expected to have already studied and to further explore course topics. If a student does not take an on-line quiz that student will earn a one-point demerit for that on-line quiz. If a student takes an on-line quiz and fails it that student will earn zero points for that on-line quiz. If a student takes an on-line quiz completing all of it successfully that student will earn two points for that on-line quiz. (If it is determined that there was an error in an online quiz of such significance as to undermine its integrity the quiz will be dismissed, unscored. This is because once an online quiz is underway it is nearly impossible to make corrections.) If homework is assigned it must be submitted with each problem attempted, to the professor’s satisfaction, on the due date before the start of homework review otherwise there will be a one point demerit for that homework*. With respect to the homework it is not expected that the student will always be able to successfully complete all of the exercises. Please note your homework will not be returned; hence, it is suggested you take a picture of your homework before submitting it. The expectation is that students will attend both the seminar and the laboratory. On-line quizzes and homework will typically be announced in class. There is no possibility of extra credit in this course. Disciplinary problems will result in a deduction of five points per infraction.

Attention! No food in the laboratory. All drink containers must have screw caps.

Goals of the course include students being introduced to the mathematical subjects of probability, statistics, and random processes; further, how to use the preceding to facilitate finding solutions to computer science problems.

Tentative Schedule

Week 1

1/22: Laboratory - Measures of central tendency, introduction to statistics;

Seminar - Syllabus and the basic concepts of probability.

Week 2

1/27: Laboratory - Measures of variation and start project 1;

Seminar - Mutually exclusive events, counting rules, conditional probability and independence.

1/29: Laboratory - Review of classical probability, Bayes' rule and complete project 1;

Seminar - Hypergeometric distribution and random variables (RV) both discrete and continuous.

Week 3

2/3: Laboratory - Start project 2;

Seminar - Uniform RV, probability mass functions and probability density functions.

2/5: Laboratory - Project 2;

Seminar - Cumulative distribution functions and quiz 1.

Week 4

2/10: Laboratory - Complete project 2;

Seminar - Function of a random variable (method of transformation).

2/12: Laboratory - Bernoulli RV and geometric RV;

Seminar - The binomial distribution, the expectation operator, and moments.

Week 5

2/17: Laboratory - The de Moivre - Laplace theorem and start project 3;

Seminar - The mean and variance of both a binomial and a uniform RV.

2/19: Laboratory - The de Moivre - Laplace theorem and moment generating function (MGF);

Seminar - The normal distribution, the z-table and quiz 2.

Week 6

2/24: Laboratory - Markov chains, matrix multiplication and complete project 3;

Seminar - Sum of iid RV and the central limit theorem (CLT).

2/26: Laboratory - Markov chains, eigenvectors, the stationary state;

Seminar - Theorems about mean, variance, and RV.

Week 7

3/2: Laboratory - The χ^2distribution and convolution;

Seminar - Confidence intervals (CI) and sample standard deviation.

3/4: Laboratory - The t-distribution and convolution;

Seminar - CI and quiz 3.

Week 8

3/9: Laboratory - Review for midterm practicum and expository;

Seminar - Review for midterm objective portion.

3/11: Laboratory - Practicum and expository questions;

Seminar - Midterm objective portion.

Week 9

3/16: Laboratory - Return practicum, expository;

Seminar - Return midterm objective portion.

3/18: Laboratory - Start project 4;

Seminar - Poisson distribution.

Week 10

3/23: Laboratory - Project 4;

Seminar - Poisson distribution and discrete joint distributions.

3/25: Laboratory - Complete project 4 and Markov chains;

Seminar - Discrete joint distributions and quiz 4.

Week 11 - Recess.

Week 12

4/6: Laboratory - Hypothesis testing and start project 5;

Seminar - Discrete joint distributions and covariance.

4/8: Laboratory - Project 5;

Seminar - Correlation.

Week 13

4/13: Laboratory - Markov chains and complete project 5;

Seminar - Regression.

4/15: Laboratory - Markov chains and Bayesian networks;

Seminar - Markov chains and quiz 5.

Week 14

4/20: Laboratory - Start project 6;

Seminar - Markov processes.

4/22: Laboratory - Project 6;

Seminar - Finite difference equations for Markov chains.

Week 15

4/27: Laboratory - Complete project 6;

Seminar - Finite difference equations for Markov chains.

4/29: Laboratory - Finite difference equations for Markov chains;

Seminar - Comments on stochastic differential equations (SDE) and quiz 6.

Week 16

5/4: Laboratory - SDE

Seminar - SDE

5/6: Laboratory - Review for final exam;

Seminar - Review for final exam.

5/11 through 5/16: The week of final exams

Final Exam Date, Time and Location: Scheduled by CSULB

Grade: Your grade will be determined relative to the highest score. The grade of 'A' is equivalent to a score of 90% or more of the highest score. The grade of 'B' is equivalent to a score between 80% and 89% of the highest score. The grade of 'C' is equivalent to a score between 70% and 79% of the highest score. The grade of 'D' is equivalent to a score between 60% and 69% of the highest score. The grade of 'F' is equivalent to a score below 60% of the highest score.

Academic Dishonesty: *Cheating and plagiarism will not be tolerated in this course. Any individual caught cheating on quizzes, homework, lab projects, or the final exam will be punished to the full extent allowed under University regulations. Plagiarism on papers or assignments is not acceptable and work that is plagiarized will not receive credit. Plagiarism is considered cheating. Note: Any time another person's work is used without giving them proper credit, it is considered plagiarism and cheating. At a minimum, any student caught cheating will receive no credit for the work concerned, and will receive a reduction of one letter grade from their final course grade. The official CSULB Policy on Cheating and Plagiarism can be found here:*
http://web.csulb.edu/divisions/aa/catalog/current/academic_information/cheating_plagiarism.html

Students with a disability or medical restriction who are requesting a classroom accommodation should contact the Disabled Student Services at 562-985-5401 or visit Brotman Hall, Suite 270 during 8AM-5PM weekday hours. Disabled Student Services will work with the student to identify a reasonable accommodation in partnership with appropriate academic offices and medical providers. ***We encourage students to reach out to DSS as soon as possible.***

Texts (Listed below are for reference only. Do not purchase these books.)

General Statistics by Chase and Bown, 4th Ed

Probability and Stochastic Processes by Frederick Solomon

Mathematical Statistics with Applications by Wackerly, Mendenhall, and Scheaffer

An Introduction to Mathematical Statistics and Its Applications by Larsen and Marx, 2nd Ed

Probability and Statistics by Murray Spiegel

Introduction to Stochastic Processes by Hoel, Port, and Stone

* An effort is made to post the homework in a timely manner. Ideally, you will be provided with sufficient time to complete the homework. On those occasions when the homework assignment is posted close to the lecture (due date) you are expected to print the assignment sign your name and I.D. # to it and submit it with the problems either attempted or commented on.

NB: If you will, in a courteous manner, convey to the lecturer if you cannot see the information on the board.

Any student who is facing academic or personal challenges due to difficulty in affording groceries/food and/or lacking a safe and stable living environment is urged to contact the CSULB Student Emergency Intervention & Wellness Program. The website outlining the resources available is www.csulb.edu/basicneeds. Students can also e-mail supportingstudents@csulb.edu or call 562/985.2038. If comfortable, students may reach out to the professor as they may be able to identify additional resources.