CS/SE 3341   Fall 2016

Probability and Statistics in Computer Science and Software Engineering

Section 002

Tu/Th 8.30-9.45 a.m. in GR 3.420

Instructor: Dr. S. Foley

Office: FO 2.604-A

E-mail: mxf091000@utdallas.edu

Office hours: T/TH 10-11 am

Internet :

https://elearning.utdallas.edu/

Here you can check your *grades* and join *discussions*, *mail*, or *chat* with your classmates.

Homework is done via WebWork

Campus   https://euler.utdallas.edu/webwork2

Off Campus, First login using UTD VPN using http://www.utdallas.edu/ir/howto/utd-vpn/

Search box type in   https://euler.utdallas.edu/webwork2/

Login and password are the same and it is your netid. (NETID for BOTH) Once you login change your password.

Textbooks :

Probability and Statistics for Computer Scientists,
by M. Baron, Chapman & Hall/CRC Press (2007), ISBN 1584886412

I cover required material in the given time. It is always a good idea to have a book for further reading. Due to limited time it is not possible to go over every proof.

Text covers all the topics of our course at the junior/senior level and has additional material on computer simulations and Statistics. It has many examples and exercises in each chapter.

Grading :

Homework, weekly	=	10%
Weekly Quizzes	=	15%
Midterm Exam 1	=	25%
Midterm Exam 2	=	25%
Final exam	=	25%

All exam will be during class time in class.

Grade Policy

The course grade is determined from the following:

Weights: 20%   Quizzes scaled to 100%

20%   Homework scaled to 100%

60%   Midterm and Final Examinations together (20% + 20% +20%)

Grade Scale   [96.6,100]...A+ [93.3,96.6).....A   [90,93.3).....A-

[86.6,90).....B+ [83.3,86.6).....B [80,83.3).....B-

[76.6,80).....C+ [73.3,76.6).....C [70,73.3),....C-

[66.6,70).....D+ [63.3,66.6).....D [60,63.3).....D-,   F Below 63.3

Rules : Exams and quizzes are **closed-book** (occasionally, we may provide a cheat-sheet).

No electronic devices *during lectures, exams, and quizzes.* No use of laptops, iPods, iPads, telephones, and Playstations. For any exception from this rule, ask your instructor for permission.

Calculators are allowed, but not for graphing or matrix computations. Any simple calculator is absolutely sufficient.

On quizzes and exams, **show your work**. We grade your *solutions*, not your answers. Therefore, no work - no credit.

No late exams or quizzes. However, it may be possible to take an exam or quiz early, for a good reason, for example, a business trip. So, plan ahead.

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Tips : A steady effort to work out <u>all</u> the assigned homework problems is your best chance to succeed in this course. Believe us or ask the former students of this course! So, get good practice by solving the **practice exercises**, then submit the required problems for a grade. Every week, complete your homework **before** the quiz, so you will be better prepared for it (and you have to do the homework anyway). Do not procrastinate till the last hour - what if the internet suddenly fails?

For each exam/quiz, **review** all the new concepts, methods, formulae, etc. Try to understand the methods rather than to memorize them.

Be sure to have the required **Calculus skills** for each exam and quiz. If your Calculus skills are rusty, check the course schedule and the table of Calculus skills below and review the needed

chapters of your Calculus book or your Calculus lecture notes. This is not a formality - basic Calculus skills will actually be used in this course.

Attend the lectures. Arrive on time and participate. Keep neatly organized **lecture notes** and other course materials for your easy and convenient use.

Extra help: 1. Teaching Assistant -
                            Office: Email:

    2. Math Lab (Calculus, Probability).   http://www.utdallas.edu/GEMS/mathlab/

    3. Calculus video reviews   http://online.math.uh.edu/HoustonACT/videocalculus/

    4. Feel free to attend, additionally, the other section of this course for extra review.

*** HW and quizzes due in a particular week are always from the material covered in the week before*****
Best way to study for a quiz is to do the HW, many questions are very similar to HW questions.

Date	Topic	
Aug 23	Introduction.	
Aug 25	Probability rules.	
Aug 30	Conditional probability. Independence. Bayes' Rule.	
Sept 1	Law of Total Probability	HW1 Due, Q1
Sept 6	Random variables and random vectors. Joint and	
Sept 8	marginal distributions. Expectation and variance.	HW2 Due, Q2
Sept 13	Discrete distributions: Bernoulli, Binomial,	
Sept 15	Geometric, and Poisson.	HW3 Due, Q3
Sept 20	Continuous distributions and densities:	
Sept 22	Uniform, Exponential, Gamma, Normal	HW4 Due, Q4
Sept 27	Normal questions	
Sept 29	**Midterm Exam 1** covers material up to Sept 15, HW5	HW5 Due Exam 1
Oct 4	Central Limit Theorem and Normal	
Oct 6	Approximations	Q5 (normal questions)
Oct 11	Stochastic processes: concepts and	
Oct 13	classifications. Bernoulli process. Poisson process.	HW6 Due, Q6
Oct 18	Markov chains. Transition probabilities.	
Oct 20	Steady-state distribution.	HW7 Due, Q7
Oct 25	Discrete-time queuing systems.	
Oct 27	Bernoulli single-server queuing process. Limited and unlimited capacity	HW8 Due, Q8
Nov 1	Continuous-time queuing processes.	
Nov 3	M/M/1 system and its steady state.	HW9 Due, Q9
Nov 8	Open day	
Nov 10	**Midterm Exam 2,** covers material up to Oct 27	HW10 Due, Exam 2
Nov 15	Confidence intervals and hypothesis testing.	
Nov 17		Q10 (MM1 Systems)
Nov 22	THANKSGIVNG BREAK	
Nov 24		HW11Due, Q11
Nov 29	Two-sample statistical procedures. Inference about	
Dec 1	proportions.	HW12 Due, Q12
12/6	**Final Exam**	

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Learning Objectives/Outcomes

Students will learn fundamental rules of Probability, discrete and continuous distributions, and statistical methods most commonly used in Computer Science and Software Engineering. They will be introduced to stochastic processes, Markov chains, statistical inference, and Monte Carlo methods and will apply the theory and methods to the evaluation of queuing systems and computation of their vital characteristics.

Catalogue Course Description

Axiomatic probability theory, independence, conditional probability. Discrete and continuous random variables, special distributions of importance to CS/SE and expectation. Simulation of random variables and Monte Carlo methods. Central limit theorem. Basic statistical inference, parameter estimation, hypothesis testing, and linear regression. Introduction to stochastic processes. Illustrative examples and simulation exercises from queuing, reliability, and other CS/SE applications. Students cannot get credit for both CS/SE 3341 and ENGR 3341. (Same as SE 3341) (3 semester hours) (3-0)

Prerequisites: Prerequisites: MATH 1326 or MATH 2414 or MATH 2419, and CE/CS/TE 2305.

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3, and in Title V, Rules on Student Services and Activities of the university's Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's Handbook of Operating Procedures.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Office of Student AccessAbility

Academic accommodations for each student are determined by the Office of Student AccessAbility on an individual basis, with input from qualified professionals. Accommodations are intended to level the playing field for students with disabilities, while maintaining the academic integrity and standards set by the University.

The contact information for the Office of Student AccessAbility is: 972-883-2098 (Office), 972-883-6561 (Fax), studentaccess@utdallas.edu, http://www.utdallas.edu/studentaccess/.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated. The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the

assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment. If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

For the complete set of UT Dallas Syllabus Policies and Procedures,
see http://coursebook.utdallas.edu/syllabus-policies/.