

Number: **STAT/CS/SE 3341.007**
Title: **Probability and Statistics in Computer
Science and Software Engineering**
Term: Fall 2024
Hours: Monday & Wednesday, 11:30 – 12:45 pm
Classroom: GR 2.530



Instructor Information

Name: **Octavious Smiley**, Assistant Professor of Instruction
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Office: FN 3.118B
Hours: Wednesday 1-2pm

Teaching Assistant Information

Name: **Rozina Akter**
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Tutoring: The Student Success Center Peer Tutoring program is offering drop-in tutoring (but not one-on-one appointments)

Course Information

Pre-requisite: (MATH 1326 or MATH 2414 or MATH 2419), and (CE 2305 or CS 2305) and (MATH 2418)
Description: Axiomatic probability theory, independence, conditional probability. Discrete and continuous random variables, special distributions of importance, 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.
Required text: *Probability and Statistics for Computer Scientists, 2nd edition* by Michael Baron
Non-required text: *Probability and Statistics* by Morris H. DeGroot, *Probability and Statistics: The Science of Uncertainty* by Michael J. Evans (The answers are in the back of the book)

Learning Outcomes

- Probability:
- Apply the fundamental probability rules and concepts.
 - Apply common discrete and continuous probability distributions.
 - Relate calculus to probability to solve probability problems.
 - Learn the basics of stochastic processes and its classical applications.
- Statistics:
- Understand common numerical summaries and exploratory analyses of data.
 - Choose the appropriate statistical analysis method to answer a typical statistical question.
 - Construct confidence intervals and perform tests of significance to make statistical inferences.
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Grading Policies

- Summary:
- **30%**: Homework
 - **20%**: Quiz
 - **25%**: Exam 1
 - **25%**: Exam 2
- Homework:
- Individual-based
 - Must submit a pdf document (convert photos)
 - Submit to eLearning
 - Due prior to the start of class on the due date
 - Two lowest homework scores will be extra credit
 - Each homework has 10 points
- Standard Quizzes:
- Individual-based
 - Open Notes (Including internet)
 - Pass/Fail (50% or more to pass)
 - Multiple Choice
 - At least lowest 3 will be dropped
 - Must be in class to take quiz
 - Pop quizzes are possible/likely
 - No make-ups under any circumstance

- Midterm Quiz:
- For the final grade, treated the same as normal quiz, and eligible to be dropped
 - Not all multiple choice
 - You do not need to take in class, although it is strongly suggested
 - The raw quiz score will be used to provide an informative midterm grade and has no added use past that
- Exams:
- Individual-based
 - One side of 3x5 NoteCard per exam
 - Free response
 - In-class
 - The first 4 questions are mandatory. You can choose which 4 out of the final 6 to solve.
 - **DO NOT EVEN ATTEMPT TO SOLVE ALL OF THE FINAL 6 QUESTIONS. YOU WILL RUN OUT OF TIME.**
 - Must bring a marker or sharpie to fully blot out the questions you wont solve. If directions are not followed, you risk forfeiting points.
 - If exam average is higher than quiz average, it will replace the quiz average
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Grading Criteria

Grade	Percentage Range
A+	100+
A	[90, 100)
B+	[87, 90)
B	[80, 87)
C+	[70, 80)
C	[60, 70)
D+	[50, 60)
D	[40, 50)
F	[0, 40)

Course Schedule (**Tentative**)

Date	Topic	Due on this Date
Mon, Aug 19	Course overview + Probability Basics	
Wed, Aug 21	Probability Basics + Typical Probability Questions	
Mon, Aug 26	Combinatorics	
Wed, Aug 28	Conditional Probability and Independence	HW1
Mon, Sep 2	Labor Day	
Wed, Sep 4	Bayes Theorem + Monty Hall and Simpson's Paradox	HW2
Mon, Sep 9	Discrete Random Variables and an Introduction to Distributions	
Wed, Sep 11	Joint Distributions and Marginal Distributions	HW3
Mon, Sep 16	Expectations and Variance + practice questions	
Wed, Sep 18	Families of Discrete Distributions	HW4
Mon, Sep 23	Midterm Quiz (Mandatory Class Attendance)	
Wed, Sep 25	Continuous Random Variables	HW5
Mon, Sep 30	Families of Continuous Random Variables + practice questions	
Wed, Oct 2	The Central Limit Theorem	HW6
Mon, Oct 7	Poisson, Exponential, and Gamma Connection	
Wed, Oct 9	Markov Processes and Markov Chains	HW7
Mon, Oct 14	Counting Processes	
Wed, Oct 16	Review for Exam #1	HW8
Mon, Oct 21	Exam #1 (Mandatory Class Attendance)	
Wed, Oct 23	Introduction to Statistics + Parameter Estimation	
Mon, Oct 28	Parameter Estimation + Confidence Intervals	
Wed, Oct 30	Confidence Intervals	HW9
Mon, Nov 4	Confidence Intervals	
Wed, Nov 6	Introduction to Hypothesis Testing	
Mon, Nov 11	Z and T-Test	
Wed, Nov 13	Z and T-Test	
Mon, Nov 18	χ^2 Distribution and Corresponding Tests	
Wed, Nov 20	χ^2 Distribution and Corresponding Tests + Correlation and Regression	
Mon, Nov 25	Fall Break	
Wed, Nov 27	Fall Break	
Mon, Dec 2	Review for Exam #2	HW10
Wed, Dec 4	Exam #2 (Mandatory Class Attendance)	

Course Policies

Electronic devices:	Calculators are permitted for exams, but not cell phones, computers, tablets, etc. Limit the use of all devices during class.
Make-up exams:	If you cannot take either Exam 1 or 2 in class, please send an email PRIOR to the exam start time with your class section, and you will be able to take a separate exam the following week over a set of predefined dates in the testing center. No further opportunities will be given under any circumstances without hospitalization of either you or your dependent with appropriate documentation.
Late work:	No late homework will be accepted.
Special assignments:	No special assignment is available.
Class attendance:	Although attendance is not mandatory, you are encouraged not to miss any class as the course will move at a fast pace, and there are opportunities to fortify your grade with optional pop-quizzes. The instructor will not make any accommodations for missing a class.
Comet Creed:	This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same: “As a Comet, I pledge honesty, integrity, and service in all that I do.”
UT Dallas syllabus policies and procedures:	The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus. Please go to http://go.utdallas.edu/syllabus-policies for those policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the instructor.