

Probability and Random Variables (ECE313/ECE317)

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Syllabus

► Instructor Information:

- **Instructor:** Dr. Fatima Taousser.
- **Office location:** Min Kao building 516.
- **E-mail:** ftaousse@utk.edu
- **Office hours:** Friday 3:00 am-5:00 am or by appointment.

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► Course Information:

- **Course location:** Min Kao building 622.
- **Class time:** Course fully in person every Monday, Wednesday and Friday: 9:10 am - 10:00 am.
- **Main resource:** Class Notes.
- **Website:** Canvas.
- **Suggested textbooks:** - R. D. Yates and D. J Goodman, "Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers", 3rd or 2nd edition.
- John N. Tsitsiklis and D. Bertsekas; "Introduction to Probability", 2nd edition, 2008.
- D. Williams, "Probability with Martingales" (a book on the "real" probability theory).
- **TAs:** TBA

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► Grading

- Homework assignments: $\approx 30\%$.
- An unannounced Quizzes "in class": $\approx 20\%$
- Midterm Exam: $\approx 25\%$.
- Final Exam: $\approx 25\%$.
- Some curving might be applied.

<i>Letter Grade</i>	<i>Percentage</i>
A	90% - 100%
A-	87% - 89.9%
B+	84% - 86.9%
B	80% - 83.9%
B-	77% - 79.9%
C+	74% - 76.9%
C	70% - 73.9%
D	60% - 69.9%
F	< 60%

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► **Course content**

▷ **Part I: Fundamentals of Probability**

- Set theory, Probability spaces.
- Permutations and Combinations.
- Conditional probability and Bayes theorem.
- Discrete random variables.
- Continuous random variables.
- Expectation, variance and higher order moments.

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► **Course content**

▷ **Part II: Notable uni-variate distributions**

- Bernoulli distribution.
- Binomial distribution.
- Geometric distribution.
- Uniform distribution.
- Poisson distribution.
- Exponential distribution.
- Normal (Gaussian) distribution.
- Central limit theorem.

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► Course content

▷ Part III: Notable multivariate distributions

- Joint probability distribution.
- Multivariate uniform distribution.
- Multivariate exponential distribution.
- Multivariate Gaussian distribution.

▷ Part IV: Bayesian and Linear Estimation

- Biased and unbiased estimators.
- Maximum likelihood estimate.
- Maximum A Posteriori estimate.
- Least square estimate and linear regression.