

MIDDLE EAST TECHNICAL UNIVERSITY  
Dept. of Electrical and Electronics Engineering

**EE 531: Probability and Stochastic Processes**  
Fall 2013

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COURSE WEB PAGE: [eee.metu.edu.tr/~elif/EE531/index.html](http://eee.metu.edu.tr/~elif/EE531/index.html)  
METU Online ([online.metu.edu.tr](http://online.metu.edu.tr)) will be used for assignments, announcements, grading and discussions. After the add/drop week, **please make sure you have access to the EE531 page.**

TEXTBOOK: Gallager, R.G., *Stochastic Processes: Theory for Applications*, to appear, 2013. (Draft version of the book is available on the author's web page.)

Other books that you may find useful:

1. G. Grimmett, D. Stirzaker, "*Probability and Random Processes*", Oxford, 2004.
2. S. M. Ross; "*Introduction to Probability Models*", Academic Press, 2003.
3. Bertsekas & Tsitsiklis, *Introduction to Probability* (This is the EE230 textbook. You may also find the EE230 lecture notes (available on METU OCW) useful for strengthening your background.)

COURSE OUTLINE:

Topic	Week(s)
(Chp 1) Probability review (measure, probability space, axioms, random variables, conditional probabilities, expectations, basic inequalities, stochastic convergence, laws of large numbers)	2
(Chp 2) Poisson processes (alternative definitions, splitting and merging, applications in modeling)	1.5
(Chp 3) Gaussian random vectors and processes (jointly Gaussian random vectors, covariance matrices and properties, Gaussian processes, stationarity, orthonormal expansions, filtering continuous time stochastic processes, White noise, The Wiener process, Brownian motion, circular symmetry and complex Gaussian rv's, linear transformations)	4
(Chp 4) Finite-state Markov Chains (classification of states, matrix representation, ergodic Markov chains, eigenvalues and eigenvectors of MCs, expected first passage time, Markov decision theory and dynamic programming)	3.5
(Chp 6) Countable-State Markov Chains (steady state, positive recurrence, null recurrence, transience)	1
(Chp 9) Random walks, threshold crossings, The Chernoff bound, Wald's Inequality, Martingales	2

(For more detail and topic subtitles please see the highlighted ToC of the textbook available on course webpage. The time allocations are approximate and are subject to change.)

**Tentative Grading Policy:** 3 Exams 84% (28% each) HW&Attendance: 16%