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| **Week** | **Chapter** | **Topics** |
| 1 |  | Definition of stochastic system, continuous vs discrete, one-sided vs. two-sided. |
| 2 | 4 | Markov Property, definition of Markov Chain. Chapman-Kolmogorov equations, classification of states. |
| 3 | 4 (cont.) | Stationary probabilities and applications (genetics, arrival processes. |
| 4 | 4 (cont.) | Applications: Gambler’s Ruin, Kelly criterion, Drug trials. |
| 5 | 4 (cont.) | Mean time in transient States, MIDTERM. |
| 6 | 4 (cont.);  part of 6 | Markov Chain Monte Carlo, Hidden Markov Chains, intro to continuous Markov Chains. |
| 7 | 10 | Intro to Brownian Motion, Hitting times. |
| 8 | 10 (cont.) | Maximum Variable, Gambler’s ruin (version 3). |
| 9 | 10 (cont.) | Brownian motion with Drift, Geometric Brownian Motion. |
| 10 | 10 (cont.) | Stock Option pricing, White noise, Gaussian Processes. |

**MATH 130C– Suggested Syllabus**

**Textbook**: *Introduction to Probability Models, 12th edition*, by S. Ross