1. **Concluding discussion** of martingale topics from Chapter 10 in the Gut text

2. **Markov Chains**
   - (a) Strong Markov property
   - (b) Transience and recurrence
   - (c) Limit theorems and invariant measures

3. **Brownian Motion**
   - (a) Construction and basic properties
   - (b) Brownian motion as martingale
   - (c) Brownian motion as Markov process; reflection principle
   - (d) Functional Central Limit Theorem; Donsker’s Theorem
   - (e) Law of the Iterated Logarithm

4. **Stochastic Integral** (with respect to Brownian Motion)
   - (a) Construction and basic properties
   - (b) Itô’s Formula
   - (c) Lebesgue’s characterization of Brownian Motion

5. **Poisson Processes**
   - (a) On the real line
   - (b) On more general spaces
Reading List

On Reserve.


2. Çinlar, E.: *Probability and Stochastics* [Electronic resource: https://roger.ucsd.edu/record=b7035407 ~ S9]


3. Freedman, D. *Brownian motion and diffusion* [QA274.75 .F74]


6. Knight, F.B. *Essentials of Brownian motion and diffusion* [QA274.75 .K58]


More advanced reading.


12. Revuz, D & Yor, M. *Continuous martingales and Brownian motion* (3rd ed) [QA274.5 .R48 1999]