MARKOV PROCESSES

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This is a course on continuous time Markov Processes. It assumes the students are familiar with Probability with Measure Theory. Below is a (pretty ambitious) course outline.

1. Basic definitions. Transition semigroups, probability spaces associated with Markov Processes, shift operators, the simple Markov property.
2. Feller Processes–the construction of their right continuous left limits modifications.
3. The strong Markov Property.
4. Infinitesimal Generators. Diffusions, Levy processes and Ito processes in $\Re^d$. The martingale Problem.
5. Some elements of Potential Theory: potentials and excessive functions, polar semipolar and thin sets, the fine topology. Right processes.
6. Multiplicative functions and subprocesses. Additive functionals and random time change.
7. Transience and Recurrence of Markov processes.
8. Local time of Markov processes and elements of Excursion Theory.
9. Duality and time reversal.

The course meets on Tuesday 2:30-5:30. The first lecture on November 14.