

## Lecture times and locations

- Tuesday 1400-1500 AC216
- Wednesday 1400-1500 AC203

## Course lecturer

- Dr. Milovan Krnjajić  
 office: 205 Aras de Brun  
 email: [milovan.krnjajic@nuigalway.ie](mailto:milovan.krnjajic@nuigalway.ie) phone: 091 49 2327  
 office hours: open door policy and by appointment (e-mail)  
 Tutorials: to be arranged

## Course web page

- All information will be communicated through the Blackboard or in the class

## Course description

The goal of the course is to introduce the main ideas and methods of stochastic models having in view applications to finance. Some of the topics are as follows:

- A review of probability theory: - discrete and continuous random variables (r.v.) - joint and conditional distributions - expectation, variance, sums of iid r.v.-s - conditional expectation - probability generating functions - moment generating functions
- Random sums of r.v.-s
- Branching processes
- Markov property
- Random walk with absorbing barriers (Gambler's ruin)
- Classification of states for a finite discrete Markov chain (MC)
- Stationary/invariant prob. distribution of a MC
- Absorbing MC; Random walk on  $R^d$
- Mean first passage time
- Poisson process (independent increments formulation; inter-arrival times formulation)

## Course work and examination

- Continuous assessment, including homework assignments and in-class tests, will be worth (about) 20-25% of the final mark. Examination will be according to the University rules and schedule.

## Reference books

- S. Ross, *Introduction to Probability Models*, Academic Press 1996.
- A. Papoulis, U. Pillai, *Probability, Random Variables and Stochastic Processes*, MacGraw Hill, 2002.
- Hoel, Port, and Stone, *Introduction to Stochastic Processes*, Houghton Mifflin, 1972.
- C. Grinstead and L. Snell, *Introduction to Probability*, American Mathematics Society, 1997.  
**NOTE:** a version of the book available online (please **download it!**):  
[http://www.dartmouth.edu/~chance/teaching\\_aids/books\\_articles/probability\\_book/book.html](http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/book.html)
- R.G. Gallager, *Discrete Stochastic Processes*, Kluwer, 1996.
- G. Grimmett and D. Stirzaker, *Probability and Random Processes*, Oxford University Press, 2001.
- G. Lawler, *Introduction to Stochastic Processes*, Chapman & Hall, 1995.