Stochastic Processes

Lecture 00: Course Logistics

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Topics to be Covered (Tentative)

- Convergence of sequences of random variables
  - Weak law of large numbers
  - Strong law of large numbers
  - Central limit theorem
- Theory of discrete time Markov chains (finite state space)
- Theory of Poisson processes
- Theory of martingales

Disclaimer

This is a grad-level course on stochastic processes
Prior background of measure-theoretic probability will be assumed
Students crediting the course are expected to be comfortable with the notions of:

- σ-algebras, measurable functions (random variables), probability laws and independence of random variables, abstract integrals and expectations, moment generating functions, characteristic functions

For a refresher on the preceding topics, see Prof. Krishna Jagannathan's NPTEL lecture series

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Assessment

Attendance	10%
Quizzes	20%
Mid-Term Exam	30%
Final Exam	40%

- All Tuesday lectures will be from 4:00 PM to 6:00 PM, with a break of 10 minutes after 1 hour
- All Friday lectures will be from 2:00 PM to 4:00 PM, with a break of 10 minutes after 1 hour
- Quizzes will be conducted on **Tuesdays from 6:15 PM to 7:00 PM post lecture**
- Total of **six quizzes** will be conducted; **four best scores** will be considered towards overall assessment
- Each quiz will be for **five points**

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References

- *Discrete Event Stochastic Processes*
  Lecture notes by Prof. Anurag Kumar, Department of ECE, IISc
- *Stochastic Processes: Theory for Applications*
  Robert G. Gallager, Cambridge University Press, 2013
- *Probability and Random Processes*
  Geoffrey Grimmett and David Stirzaker
- *Random Processes for Engineers*
  Lecture notes by Prof. Bruce Hajek, UIUC
  (Free copy of the pdf available on the author's website)
- *Probability: Theory and Examples*
  Lecture notes by Prof. Rick Durrett, Duke University
  (Free copy of the pdf available on the author's website)

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Other Useful References

- *Probability Foundations for Electrical Engineers*.
  NPTEL lectures by Prof. Krishna Jagannathan, IIT Madras
- *Probability and Stochastic Processes*.
  NPTEL lectures by Prof. Krishna Jagannathan, IIT Madras
- *Stochastic Processes*
  Video lectures by Prof. Vincent Y. F. Tan, National University of Singapore

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The Team

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