



Advanced Topics in Probability and Random Processes

Aerospace Engineering

Instructor Name: Prof.P.K. Bora

Institute: IIT Guwahati

Department: Electrical Engineering

Course Intro: : The course will cover mainly two broad areas: (1) the concepts of the convergence a sequence of random variables leading to the explanation of important concepts like the laws of large numbers, central limit theorem; and (2) Markov chains that include the analysis of discrete and continuous time Markov Chains and their applications.

Pre Requisites: : Basic Course in Probability

Core/Elective: : Elective

UG/PG: : Both

Industry Support : None

Reference : Books: (1) Vijay K. Rohatgi, A.K. Md. Ehsanes Salehi, An Introduction to Probability and Statistics, Wiley, 2011 (2) Jyotiprasad Medhi, Stochastic Processes, 3rd Edition, New AgeInternational, 2009. (3) Sheldon M. Ross Introduction to Probability Models Academic Press, 2007

About Instructor: The instructor is a Professor in the Department of EEE, IIT Guwahati with the experience of teaching a number of courses related to the proposed course and developing an NPTEL web course on Probability and Random Processes.



COURSE PLAN

SL.NO	Week	Module Name
1	1	Introduction to probability and Random Processes, Infinite sequence of events
2	2	Convergence of a sequence of random variables 1
3	3	Convergence of a sequence of random variables 2
4	4	Laws of large numbers, central limit theorem
5	5	Discrete time Markov chains 1: Markov property, state transition, Chapman Kolmogorov Equations
6	6	Discrete time Markov chains 2: classes and recurrence properties
7	7	Continuous time Markov Chain 1; Forward and backward equations
8	8	Continuous time Markov Chain 2: Birth-death Processes