

Introduction to Stochastic Processes and its Applications - Web course

COURSE OUTLINE

This course in the area of Introduction and application to stochastic processes, will start with the concepts of Random walks, Markov Chains, Markov Processes, Poisson Process and Kolmogorov equations.

Other topics which will also be covered are in Branching process, Application of Markov chains, Markov Processes with discrete and continuous state space, Renewal Processes and Theory, Limit theorems in renewal theory.

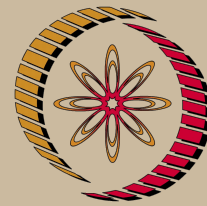
The students will also be given a good background and understanding of application of renewal theory, Stationary Process with discrete and continuous parameters, Random walks and related areas.

Additionally emphasis will be laid in the different application of stochastic processes in areas like

(i) Queueing theory, (ii) Scheduling, (iii) Manufacturing, (iv) Finance, (v) Marketing, etc, will be there to acquaint the participants of the enormous practicality of stochastic processes in all spheres of engineering and management science.

COURSE DETAIL

S.No	Topics	No.of Hours
1	Concepts of Random walks, Markov Chains, Markov Processes.	4
2	Poisson Process and Kolmogorov equations.	4
3	Branching process, Application of Markov chains, Markov Processes with discrete and continuous state space.	5
4	Renewal Processes and Theory, Limit theorems in renewal theory.	5
5	Understanding of applications of renewal theory, Stationary Process with discrete and continuous parameters.	5
6	Random walks and related areas.	5
7	Application of stochastic processes in areas like queueing theory.	2



NP-TEL

NPTEL

<http://nptel.iitm.ac.in>

Management

Pre-requisites:

1. Advanced level of Probability and Statistics (M.Tech level).
2. Advanced level of Mathematics (M.Sc level).

Additional Reading:

1. Cox, D. R. and Miller, H. D. (1970), The Theory of Stochastic Processes, Methuen & Co. Ltd. ISBN: 0412151707.
2. Ross, S. M. (1996), Stochastic Processes, John Wiley & Sons. ISBN: 0471120626.
3. Bhattacharya, R. N. and Waymire, E. C. (1990), Stochastic Processes with Applications, Wiley Interscience. ISBN: 0471842729.
4. Feller, W. (1968), An Introduction to Probability Theory and its Applications, Volume 1 & II, John Wiley. ISBN: 9780471257080 & 9780471257097.
5. Heyman D. and Sobel, M. (edited) (1982), Stochastic Models in Handbook of Operations Research and Management Science, (Vol.2), North Holland. ISBN: 0444874739.
6. Pinedo, M. (2002), Scheduling: Theory, Algorithms and Systems, Prentice Hall. ISBN: 0130281387.
7. Wolff, R. W. (1989), Stochastic Modeling and the Theory of Queues, Prentice Hall. ISBN: 0138466920.

8	Application of stochastic processes in areas like scheduling.	2
9	Application of stochastic processes in areas like manufacturing.	2
10	Application of stochastic processes in areas like finance.	2
11	Application of stochastic processes in areas marketing.	2
12	Application of stochastic processes in areas of engineering and management science.	2
	Total	40

Coordinators:

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 Management Engineering IIT Kanpur

References:

1. Karlin, K. and Taylor, H. M. (1975), A First Course in Stochastic Processes, Academic Press. ISBN: 0-12-398552-8.
2. Karlin, K. and Taylor, H. M. (1981), A Second Course in Stochastic Processes, Academic Press. ISBN: 0-12-398650-8.