

PROBABILITY AND QUEUEING THEORY

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OBJECTIVE

To provide the required fundamental concepts in probability and queueing models, and apply these techniques in networks, image processing etc. It also gives knowledge in analyzing queueing models.

UNIT – I RANDOM VARIABLES 9+3

Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT – II TWO-DIMENSIONAL RANDOM VARIABLES 9+3

Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT – III RANDOM PROCESSES 9+3

Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT – IV QUEUEING THEORY 9+3

Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little's formula - Queues with finite waiting rooms – Finite source models.

UNIT – V NON-MARKOVIAN QUEUES & QUEUEING NETWORKS 9+3

M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and M/E κ /1 as special cases –Series queues – Open and closed Jackson networks.

TOTAL: 60

TEXT BOOKS:

1. Ibe, O.C. "Fundamentals of Applied Probability and Random Processes", Elsevier, U.P., 1st Indian Reprint, 2007.
2. Gross, D. and Harris, C.M., "Fundamentals of Queueing Theory", Wiley Student, 3rd Edition, New Jersey, 2004.

REFERENCES:

1. Allen, A.O., "Probability, Statistics and Queueing Theory with Computer Applications", Elsevier, California, 2nd Edition, 2005.
2. Taha, H.A., "Operations Research", Pearson Education, Asia, 8th Edition, 2007.
3. Trivedi, K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", PHI, New Delhi, 2nd Edition, 2009.