



Probability Foundations for Electrical Engineers

Electrical Engineering

Instructor Name: Prof.RAravind

Institute: IIT Madras

Department: Electrical Engineering

About Instructor: RAravind is a faculty member in the Department of Electrical Engineering at the Indian Institute of Technology Madras. Aravind has a PhD in electrical engineering from the University of California, Santa Barbara. His research interests include image and video processing and compression

Pre Requisites: : Basic calculus

Core/Elective: : Elective

UG/PG: : Both

Industry Support : This course is not directly relevant to industries. It is a fundamental course in probability.

Course Intro: : This course will introduce the basic foundational aspects of probability theory primarily to an electrical engineering audience. In communications, signal processing and networking applications, probability theory and models play a vital role in design and implementation. This course will prepare a student to take courses such as Digital/Wireless Communications, Adaptive Signal Processing and Communication Networks.

COURSE PLAN

| SL.NO | Week | Module Name |
|-------|------|---|
| 1 | 1 | Probability space: Experiments, sample space, events |
| 2 | 2 | Conditional probability: Baye's rule |
| 3 | 3 | Independence: Independent and dependent events, conditional independence |
| 4 | 4 | Discrete random variables: PMF, important discrete distributions |
| 5 | 5 | Continuous random variables: PDF, CDF, important continuous distributions |
| 6 | 6 | Multiple random variables: Joint distribution, independence |
| 7 | 7 | Transformation of random variables: CDF method, PDF method |
| 8 | 8 | Expectations: mean, variance, correlation, covariance |