



**ISTANBUL TECHNICAL UNIVERSITY
CIVIL ENGINEERING FACULTY
CIVIL ENGINEERING DIVISION**

PROBABILITY and STATISTICS

HOMework - I

- I. The drainage from a community during a storm is a normal random variable estimated to have a mean of 1.2 million gallons per day (mgd) and a standard deviation of 0.4 mgd; $N(1.2, 0.4)$ mgd.
- If the storm drain system is designed with a maximum drainage capacity of 1.5mgd, what is the underlying probability of flooding during a storm that is assumed in the design of the drainage system?
 - What is the probability that the drainage during a storm will be between 1.0 mgd and 1.6 mgd?
 - What is the 90-percentile drainage load from the community during a storm?
- II. Statistical data of vehicular accidents show that the annual vehicle miles (i.e. miles per vehicle per year) driven between traffic accidents can be represented by a normal random variable with a mean of 15000 miles per year and coefficient of variation (cov) of 25%.
- What is the probability of driver who drives 10000 miles per year having an accident in a year?
 - If the driver has driven 8000 miles in a given year without encountering any accident, what is the probability of his/her having an accident for the remainder of the year?
- III. The traffic density of an airport in peak hours is normally distributed. Its mean and standard deviation are **200** and **60**, respectively.
- The capacity of the airport is **350**. What is the probability that the airport will be inadequate in peak hours?
 - Supposing that the mean traffic density increases **10%** every year, the coefficient of variation remaining constant, what is the probability that the airport will be inadequate in 10 years time?