University of Sri Jayewardenepura

Department of Statistics

STA 114 2.0 Probability and Distribution Theory I

Type : Core

Duration: 30 lecture hours

Pre-requisites: None

Objectives:

- The objective of this course unit is to provide the basic knowledge required to calculate probabilities of events.

Course contents:

1 ELEMENTS OF PROBABILITY

1.1 Introduction
    1.1.1 Terminology
1.2 Events
    1.2.1 Events as subsets of sample spaces
    1.2.2 Random variables
    1.2.3 Events in terms of random variables
1.3 Event operations
    1.3.1 Complement
    1.3.2 Intersection
    1.3.3 Union
1.4 Axioms of probability
1.5 Interpretations of probability
    1.5.1 Relative frequency interpretation
    1.5.2 Subjective interpretation
1.6 Methods for determining probability
    1.6.1 Classical method
    1.6.2 Relative frequency method
    1.6.3 Subjective method
    1.6.4 Using probability models

4 MODELS FOR CONTINUOUS DISTRIBUTIONS

4.1 Uniform distribution
    4.1.1 Mean and variance of uniform distribution
4.2 Normal distribution
    4.2.1 Mean and variance of the normal distribution
    4.2.2 Calculation of normal probability
    4.2.3 Empirical rule for a normal distribution
    4.2.4 Calculation of normal quantiles

Learning Outcomes: By the end of the course unit students should be able to,

- explain the meaning of technical terms.
- state and prove probability rules and theorems.
- write down events as subsets of sample spaces.
- property define events related to problem.
- write down complex events in terms of basic events.
- calculate probability of events using probability rules.
- interpret the probability.
- identify random variables of interest in problems.
- express events of interest in terms of random variables.
- select suitable probability models for random variables.
- correctly use the notations introduced in class.
- calculate probabilities, moments and quantiles related to distributions.
- use relationships between distributions in solving problems.
- Solve the problems provided in class, answer the past papers available on the website of the department, and solve any other problem of similar nature that involves the course content.

Method of Assessment:

1. Mid Semester Examination - 20%
2. End of Semester Examination - 80%

Note: At least 80% attendance for lectures is required to sit for end semester examination

Reference Text books:

- Introduction to the Theory of Statistics
  Authors: Mood, A.M., Graybill, F. A., and Boes, D. Publisher: McGraw Hill

Lecturer in charge: Ms. T. S. Talagala