
Engineering Statistics

Course No. 435

FOR WHOM INTENDED An understanding of Statistics is required in the implementation of uncertainty calculations in Metrology such as: statistical and probability concepts in measurements, confidence levels and control charts.

An understanding of statistics is also required in the analysis and measurement procedures for Random Vibration, where the various probability distributions, such as Gaussian (normal), Chi-Square, student t and F distributions and confidence levels and statistical independence play an important role.

BRIEF COURSE DESCRIPTION This TTI course covers all the usual topics in reliability and statistics and explains how the theory is applied in engineering.

In the study of basic statistics, students encounter equations which are not “user friendly.” The volume of statistical formulas and the “number-crunching” has made the true learning and application of statistics difficult for most people. In this course the actual evaluation of statistical formulas is done using programmable calculators such as the TI-82 and TI-83, which simplify the process and save hours of tedious work. This enables the student to devote more time to the overall understanding of basic statistics and applying the concepts learned.

CERTIFICATE PROGRAMS This course may be used as an elective for any [TTi specialist certificate program](#).

PREREQUISITES There are no definite prerequisites for this course. However, prior completion of TTI Distance Learning course 103-2 “Applied Mathematics” would be helpful.

TEXT Each participant will receive a set of [course notes](#), which contains most of the viewgraphs used during the presentation.

COURSE HOURS, CERTIFICATE AND CEUs
Open courses meet seven hours per day. Upcoming presentation dates can be found on our current [open course schedule](#). Class hours/days for on-site courses can vary from 14–35 hours over 2–5 days as requested by our clients. Upon successful course completion, each participant receives a certificate of completion and one Continuing Education Unit (CEU) for every ten class hours.

For [schedules](#), [general information](#) and a [registration form](#), see TTI’s web site.

Course Outline

Introduction

Definitions • Populations • Data Groups, Variables
Class Intervals • Frequency Distribution
Continuous Distributions • Continuous Distributions Histogram: Equal Class Size, Unequal Class Size
Frequency Curves • Cumulative Frequency Curve or Ogive

Measures of Data Spread

Central Tendency • Arithmetic Mean • Arithmetic Mean Median and Mode • Frequency Distributions

Measures of Dispersion

Dispersion—Mean Deviation • Mean Deviation Example
Variance • Variance—Example • Standard Deviation

Worked Example

Raw Data • Classes • Exact Class Limits
Frequency Distribution Graph
Cumulative Frequency Distribution (cf)
Arithmetic Mean for Grouped Data • Arithmetic Mean Median for Grouped Data Set
Sample Standard Deviation of Grouped Data Set

Probability

Probability Exercise • Random Data (Tossing Coins)
Expressing Probability • Venn Diagram • Rules of Addition
Theory of Intersection • Rules of Multiplication
Bayes Theorem • Hypothesis • Test • Null Hypothesis (H_0)
Critical Region • Test Statistic • Level of Significance

Distributions

Binomial Experiment • Binomial Population • Variables
Continuous Distribution • Continuous Probability Distribution
Normal Distribution • Standard Normal Distribution
Gaussian (s-Normal) Distribution • One-Tailed Test
Two-Tailed Test • Type I and II Errors • Statistical Significance
Confidence Intervals • Confidence Levels
Computing the Standard Deviation—Example

More Distributions

Chi-Square (χ^2) Distribution • Binomial Distribution
Binomial Distribution Graph • Poisson Distribution
Student’s t-Distribution • Table: t-Distribution • F-Distribution
Table: Critical Values for the F-test

Correlation and Regression

Goodness-of-Fit Tests • Correlation • Scatter Diagram
Regression Analysis • Regression • Method of Least Squares
Linear Regression

Review and Final Exam

Award of Certificates for Successful Completion



Technology Training, Inc.

(a tti group company)

Toll-free telephone:

866-884-4338 (866-TTi-4edu)

805/715-2638 • FAX 805/715-2650

E-mail: Training@ttiedu.com

<http://www.ttiedu.com>