NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF ECONOMICS AND STATISTICAL ENGINEERING

STATISTICAL ENGINEERING PROGRAM

ES512 – PARAMETRIC STATISTICAL INFERENCE

I. GENERAL INFORMATION

CODE	:	ES512 Parametric Statistical Inference
SEMESTER	:	5
CREDITS	:	4
HOURS PER WEEK	:	5 (3 Theory – 2 Practice)
PREREQUISITES	:	ES 411, ES-412
CONDITION	:	Mandatory

II. COURSE DESCRIPTION

The course prepares the student in the application of the concepts, methods and techniques of descriptive and differential statistics to describe and analyze groups of data and variables through their relevant statistical parameters. Probability concepts are presented and applied to predict expected future values of random variables. Regression techniques are applied to construct models that relate variables of a system or process through the processing of representative data. Problems of application in engineering are developed and use is made of specialized software.

III. COURSE OUTCOMES

The student:

1. Organizes data for its proper analysis and interpretation and calculates and interprets its fundamental statistical properties (mean value and variance).
2. Explain and determine the probability of events and random variables, as well as their probability density function.
3. Understands and applies random vectors and determines their joint probability density function.
4. It interprets the concept of sample distribution and applies it to calculate the probability of an event or variable.
5. Constructs linear regression models to represent the relationship between representative parameters of a data set.

The subject :

1. Continue with the concepts of random sample and statistics as bases of the Theory of Statistical Inference.
2. To discuss some problems of point estimate and by real parameter interval

3. Analyze three variations of likelihood ratios (colloquially probability) used to derive hypothesis testing about the parameters.

IV. CONTENIDO ANALITICO CALENDARIZADO

1. Sampling and Distributions

Introduction to statistical inference populations. Samples and models; Proof of entry. Distributions in normal populations. Principle of sufficiency. Sufficient statistics. Minimal sufficient statistics. Verisimilitude principle. Verisimilitude function. The principle of formal verisimilitude.

2. Point Estimation

Equivalence principle. The exponential family. Methods of point estimation. Moment methods. Maximum verisimilitude methods. Methods of evaluation of estimators. Half-square error. Informed estimators. Sufficiency and insensibility. Asymptotic evaluations. Consistency. Efficiency. Calculations and comparisons.

3. Hypothesis Testing

Introduction. Probability ratio tests. More powerful tests. Probability of errors. Power function.

4. Interval Estimation

Method of inverting a test statistician. Pivotal quantities. Pivot the distribution function. Size and probability of coverage.

V. BIBLIOGRAPHY

1. Alexander M. Mood y Franklin A. Graybill (1972) Introduction to Statistical Theory.
2. V.K. Rohatgi (1976) An Introduction to Probability Theory and Mathematical Statistics. John Wiley & Sons.
3. Markk Fiz (1963) Probability Theory Mathematical and Mathematical Statistics. John Wily & son New York, London Sydney Toronto.
4. George G. Roussas, “A First Course in mathematical Statistics”, John Wily & sons.
5. Luis Ruiz – Amaya Martin Pliego. (1995). Statistics II Inference. Editorial New Plan Collection. Madrid.
6. E.L. Lehman (1983). Theory of Point Estimation. John Wily.
7. E.L Lehman (1986). Testing Statistics Hypothesis. John Wily.
8. H.T. Nguyen G.S Rogers, (1989) “Fundamentals of Mathematical statistics” Volumen II springer - Verlag.
9. Robert V. Hogg & Allen T. Craig (1978) Introduction to mathematical statistics. Fourth Edition, Macmillan Publishing Co.,Inc. New York.