



**NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF ECONOMICS AND STATISTICAL ENGINEERING**

STATISTICAL ENGINEERING PROGRAM

EC416 – ANALYSIS OF REAL FUNCTIONS

I. GENERAL INFORMATION

CODE	: EC416 Analysis of real functions
SEMESTER	: 4
CREDITS	: 4
HOURS PER WEEK	: 5 (Teoría – Práctica)
PREREQUISITES	: Advanced Calculus
CONDITION	: Mandatory

II. COURSE DESCRIPTION

Provide the student with the basic elements of succession theory, numerical series and sequences and series of functions as well as the development of a Taylor series function so that he can apply what he has learned in courses of Probability Theory, Stochastic Processes and other theoretical statistical courses that require the mathematical tools developed in this course.

III. COURSE OUTCOMES

El estudiante:

1. Explain and determine the convergence of a sequence.
2. Explain and determine the convergence of a series.
3. Calculate the Taylor series of a function.
4. Calculate the point and uniform convergence of a sequence of functions.

IV. LEARNING UNITS

1. Successions in R / 10 HOURS

Successions in R. Convergent successions: boundary theorems for successions. Infinite limits. Theorems of comparison and localization. Monotonous sequences and their relation to convergence. Subsections: no limits exist. Intervals embedded. Inheritance limit points. The Bolzano-Weierstrass theorem. Cauchy's successions.

2. Numeric series / 15 HOURS

Numerical series. Elementary convergence results. The convergence of series with negative terms. Convergence criteria: criterion of quotient and root. Criterion of the integral and asymptotic comparison. Series with alternate terms: Cauchy criterion.

3. Sequences and series of functions / 28 HOURS

Point and uniform convergence. Criteria for uniform convergence. Continuity and uniform convergence. Integration term to term. Differentiation term to term. Series of powers and analytical functions. Polynomials and Taylor series.

V. METHODOLOGY

The course is developed through the system of theoretical and practical classes with expositions of the teacher and the active participation of the student. Power Point presentations will be used in those parts of the course with greater complexity so as to make the presentation of the topics more fluid. Students will build the knowledge related to the course through the interaction between theory and practice. Both the conceptual management and the practical application of what is learned will be required.

VI. GRADING FORMULA

Evaluating System "C". Calculating the final average: **PF = (EP + EF + PP) /3**

Four graded practices are applied, the lowest grade is deleted.

EP: Mid-term Exam, EF: Final Exam, PP: Average of qualified practices

VII. BIBLIOGRAPHY

1. Thie, Paul: An Introduction to analysis. The Jones and Barlet Publishers 2010.
2. Apostol, Tom...: Mathematical Analysis. 2a Edition. Addison-Wesley 1974.
3. Zorich, Vladimir Mathematical Analysis Vol I-II. Springer-Verlag. 2003.