INSTITUTO DE FÍSICA
FACULTAD DE FÍSICA

COURSE : **INTRODUCTION TO GAUGE FIELD THEORIES**
TRANSLATION : INTRODUCCIÓN A LAS TEORÍAS DE GAUGE
NUMBER : FIM3110
MODULES : 2
CREDTIS : 15 UC / 9 SCT
REQUISITES : (FIZ0221 or FIZ0224) and FIZ0411 and FIZ0412
RESTRICTIONS : 030501
CARÁCTER : OPTATIVE
FORMAT : THEORETICAL LECTURES
KEY WORDS : GAUGE THEORIES, QUANTIZATION, RENORMALIZATION THEORY, CALCULATION OF FEYNMAN DIAGRAMS
QUALIFICATION : STANDARD
FORMATIVE LEVEL : MAGISTER
DISCIPLINE : PHYSICS

## I. COURSE DESCRIPTION

This course will familiarize the student with the basic conceptual techniques of gauge theories including Quantization, Renormalization Theory, calculation of Feynman Diagrams, anomalies and supersymmetry.

## II. LEARNING OUTCOMES

1. Know and understand the Quantization of Gauge Theories.
2. Critically analyze the applications of Gauge Theories in areas of research in the discipline.

## III. CONTENT

1. Functional integration
2 Perturbation Theory and Feynman Diagrams
3 Quantization of the Yang-Mills field
4.Renormalization of Gauge Theories
5.Supersymmetry
6.Applications:
- Weinberg-Salam model
- Asymptotic Freedom
- Gauge Theories of Strong Interactions

## IV. METHOLOGICAL STRATEGIES

Lecture classes.

## V. EVALUATIVE STRATEGIES

Partial test: 30%
Talk: 30%
Final exam: 40%

## VI. BIBLIOGRAPHY

**REQUIRED**


1. B. Sakita, "Quantum Theory of Many-variable systems and Fields\", World Scientific 1985.
2. L.D. Faddeev and A.A. Slavnov, "Gauge Fields: Introduction to Quantum Theory\", Benjamin 1980.

3. S. Weinberg, "The Quantum Theory of Fields", vols. 1,2, Cambridge U. Press 1995.
4. Peskin y Schroeder. An Introduction to Quantum Field Theory, Westview Press, 1995.

**OPTIONAL**

N7A