INSTITUTO DE FÍSICA
FACULTAD DE FÍSICA

COURSE	:	**STRING THEORY**
TRANSLATION	:	TEORÍA DE CUERDAS
NUMBER	:	FIM3402
MODULES	:	2
CREDITS	:	15 UC / 9 SCT
REQUISITES	:	FIZ0322, FIZ0412, FIM4545, FIM8530
CONECTOR	:	AND
RESTRICTIONS	:	030501
CHARACTER	:	OPTATIVE
FORMAT	:	THEORETICAL LECTURES
QUALIFICATION	:	STANDARD
FORMATIVE LEVEL	:	DOCTORATE
DISCIPLINE	:	PHYSICS

I.COURSE DESCRIPTION

String Theory is the most promising theory known to date to achieve the unification of all fundamental interactions (A. Einstein's unrealized dream). This theory requires a thorough understanding of many aspects of modern physics such as General Relativity and Quantum Mechanics. In this course, an introduction as elementary as possible will be given, so that it is accessible to students of the last years of Bachelor of Physics.

II.LEARNING OUTCOMES

Familiarize the student with the basic aspects of String Theory. During the first part of the course there will be an introduction to Conformal Field Theory, which has applications to Statistical Mechanics, Solids, and other areas of physics.

III.CONTENT

1. Classical Gauge Field Theory:
(a) Actions with gauge invariance,
(b) Gauge transformation generators and their algebra
(c) Yang-Mills action
(d) Parameterized particle and other examples.
2. Quantum Conformal Field Theory
(a) Conformal invariance in two dimensions
(b) Radial quantization, OPE's and the momentum energy tensor
(c) Virasoro algebra and central extensions
(d) Scalar and Dirac fields
(e) Modular invariance
3. Introduction to String Theory
(a) Action of the rope and its symmetries
(b) Construction of the Hilbert space and associated particles
(c) T-duality and brane theory
(d) The AdS / CFT correspondence

IV.METHODOLOGICAL STRATEGIES

Theoretical lectures

V.EVALUATIVE STRATEGIES

It will be evaluated by three tests (33% each one)

VI.BIBLIOGRAPHY

REQUIRED

"*Superstrings*", M.Green, J. Schwarz, E. Witten, Cambridge U. Press 1987

"*A first course in String Theory*", B. Zwiebach, Cambridge U. Press 2004

"Quantization of gauge Systems", M.Henneaux, C.Teitelboim, Princeton U. Press,1992

"*Conformal Field Theory*", P. Di Francesco, P. Mathieu, D. Sénéchal, Springer 1997

OPTIONAL

N/A