## INSTITUTO DE FÍSICA
### FACULTAD DE FÍSICA

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COURSE          :    CLASSICAL MECHANICS
TRANSLATION     :    MECÁNICA CLÁSICA
NUMBER          :    FIM8420
CREDITS         :    15 UC / 9 SCT
REQUISITES      :    FIZ0222
CONECTOR        :    AND
RESTRICTIONS    :    030401, 030501
CHARACTER       :    MINIMUM
FORMAT          :    THEORETICAL LECTURES
QUALIFICATION   :    STANDARD
FORMATIVE LEVEL :    MAGISTER
DISCIPLINE      :    PHYSICS
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**I. COURSE DESCRIPTION**

The course presents a modern vision of Classical Mechanics, ranging from its traditional foundations, such as the Lagrangian and Hamiltonian Formulations, Hamilton Jacobi Theory, to current topics.

**II. LEARNING OUTCOMES**

Achieve a broad and modern vision of various topics of Classical Mechanics.

**III. CONTENT**

1. Lagrangian formulation and its application to systems with links and movement in central fields.
2. Small Oscillations.
3. Dynamics of the rigid body. Euler's equations.
4. Hamiltonian Formulation, Canonical Transformations, Poisson Brackets, Hamilton Jacobi Theory, Adiabatic Invariants.
5. Introduction to the Dynamics of Continuous Media.
6. Perturbation Theory
7. KAM theorem and Hamiltonian chaos.
8. Solitons in different media (fluid, optical, acoustic)

**IV. METHODOLOGICAL STRATEGIES**

- Lecture classes
- Expository bibliographic work

**V. EVALUATIVE STRATEGIES**

- Homework: 30%
- Tests: 50%
- Topical exposures: 20%

**VI. BIBLIOGRAPHY**

**REQUIRED**

- H. Goldstein, C. Poole, J. Safko. Classical Mechanics, Third Edition, Addison Wesley, 2002.
- A, L. Fetter, J. D. Walecka. Theoretical Mechanics of Particles and Continua, McGraw Hill 1980.
- L. D. Landau, E. M. Lifshitz. Mechanics, Volume I of Course in Theoretical Physics, Pergamon 1976.

- J. V. Jose, E. J. Saletan. Classical Dynamics, A Contemporary Approach, Cambridge University Press 1998.
- F. Scheck. Mechanics: From Newton's Laws to Deterministic Chaos, Springer Verlag 1990.

**OPTIONAL**

N/A