



**NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF MECHANICAL ENGINEERING
MECHANICAL-ELECTRICAL ENGINEERING PROGRAM**

ML253 – LABORATORY OF ROTATING ELECTRICAL MACHINES

I. GENERAL INFORMATION

CODE	: ML253 Laboratory of Rotating Electrical Machines
SEMESTER	: 8
CREDITS	: 1
HOURS PER WEEK	: 3 (Laboratories)
PREREQUISITES	: Rotating Electric Machines
CONDITION	: Mandatory

II. COURSE DESCRIPTION

Introduction: characteristics and properties of electric machines.

Dynamic characteristics of DC machines such as motors and generators (torque, power, power factor and efficiency).

Dynamic characteristics of AC machines such as motors - squirrel cage and winding rotor (torque, power, power factor and efficiency).

Dynamic characteristics of synchronous machines such as motor and generator (torque, power, power factor and efficiency).

Perform standardized test protocols.

III. COURSE OUTCOMES

- Know and identify the wiring diagrams of electrical machines.
- Recognition of the acquired modules and their varied application in the tests to be carried out in your laboratories.
- Develop and demonstrate through the drive systems the dynamic operation of electric machines.
- Carry out tests corresponding to the test protocols standardized by IEC, IEEE, NEMA, etc. That is, tests under vacuum and under load under various load conditions.
- Various industrial applications.

IV. LEARNING UNITS

Characteristics of operation and modeling of current generators.

Characteristics of operation and modeling of current engines.

Characteristics of operation and modeling of squirrel cage type engines.

Characteristics of operation and modeling of touching rings type engine.

Functional characteristics and modeling of multifunction synchronous generators.

IEC standard drive systems.

V. FÓRMULA DE EVALUACIÓN

Evaluation System "D". Calculation of Final Average: PF, is average of the grades obtained in the laboratory sessions.

VI. BIBLIOGRAPHY

Leander W. Matsch (1990) Electromagnetic and electromotive machines Edic. Alfaomega A.E.Fitzgerald - Charles Kingsley (1992) Theory and analysis of electrical machines. Irving L Cosow (1991) Electric Machines and Transformers Prentice Hall Edition George J. Thaler - Milton L. Wilcox (1974) Electric machines - Dynamic and permanent state Editorial Limusa.

George Patrick Shult (1995) Transformers and Motors - A Division of Prentice Hall Computer 11711 North College, Carmel, Indiana USA.

M.G. Say (1958) The Performance and Design of Alternating Current Machines

WEG Maquinas (1998) Manufacturer's Manual Brazil - Jaragua do Soul.

Technical manuals from WEG MAQUINAS, SIEMENS, CATERPILLAR, AMSALDO, ABB.