



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

MC327 – LABORATORY OF STRENGTH OF MATERIALS

I. GENERAL INFORMATION

CODE	: MC327 Laboratory of Strength of Materials
GRADE	: 6
CREDITS	: 1
HOURS PER WEEK	: 2
REQUIREMENTS	: MC324, MC325
CONDITION	: Mandatory

II. COURSE DESCRIPTION

Make a standard technical report as an example based on the tensile test. Compliance with technical standards on material resistance. Selection of materials to manufacture machines and devices and machines for mechanical testing. Demonstration of mechanical tests among which is the impact test, the resistance in axes, profiles, tubes and other elements of machines, bending, traction, cutting, compression, torsion, fatigue and combined. Development of a monograph that will be based theoretically and practically on one of the following topics: Axial load, torsion, flexion, column buckling, being able, at the teacher's discretion, to consider additionally some topic of interest related to the topic.

III. COURSE OUTCOMES

At the end of the course, the student will be able to:

1. Write technical reports related to material resistance tests.
2. Take advantage of the facilities of the University to carry out and develop mechanical tests.
3. Apply the theoretical knowledge acquired in the course of Materials Resistance.
4. Be able to carry out research studies regarding resistance of materials of the different elements of machines that exist in the market based on the information obtained formulates development proposals in the field of mechanical engineering.

IV. LEARNING UNITS

Concept of technical report and development of the traction test as an example. Distribution of monographic works that will be framed in the following subjects: Axial load, torsion, flexion, transversal shear, combined loads, loads in beams, column buckling, some specific work that the teacher deems appropriate.

2nd WEEK

Classroom review of technical reports on traction. Concept to be developed: Technical standards.

3rd WEEK

Review of the technical standards compiled for the monographic work. Concept to be developed: Selection of manufacturing for the design of devices and machines for mechanical testing. Demonstration of the impact test.

4th WEEK

First qualifying practice. Technical standards. Selection of manufacturing materials. The tensile test. The impact test. Receipt of technical standards reports.

5th WEEK

Concept to be developed: Mechanical testing machines. Design and manufacture of devices for mechanical testing. Demonstration of the resistance test in tubes.

6th WEEK

Calculation of resistance in devices for testing. Demonstration of the combined fatigue test.

7th WEEK

Second best practice: Mechanical testing machines. Devices for mechanical testing. Resistance in machines and devices for mechanical testing. Receive reports on machines, devices and resistance calculations.

9th WEEK

Concept to be developed: The manufacture of devices. Demonstration of the compression test.

10th WEEK

Concept to be developed: The finishing of the devices. Demonstration of the abrasion resistance test.

11th WEEK

Concept to be developed: modern technologies for testing materials. Torsion test demonstration.

12th WEEK

Concept to be developed: Continuation on the subject of modern technologies. Demonstration of the fatigue test.

13th WEEK

Third Qualified Practice: Design of machines and devices for mechanical testing. Finishing of the devices. In torsion test. In fatigue test. Modern technologies for testing materials. Receive reports on the application of modern technologies for mechanical testing.

14th WEEK

Theoretical and practical support of monographs.

15th WEEK

Theoretical and practical support of monographs.

VI.V. METHODOLOGY

The following methodological aspects are considered:

1. An analysis will be made of the status of the current infrastructure available.
2. Demonstrations of theoretical and practical examples of mechanical tests and resistance at the end of the course during the lift will be made.
3. The three-practical works that are requested are components of the monograph that are presented at the end of the course during the support.
4. The manufacturing progress of the devices and equipment that will be developed to support in a practical way the monographic work designated will be permanently supervised.

Didactic strategies

- Inductive, deductive and experimental method
- Procedure, Analysis and Synthesis.
- Forms of Exposition, dialogue, motivation and group work.

VII.VI. GRADING FORMULA

The course will be evaluated according to the "D"

Monograph (M)

Number of quizzes: 03

The final grade (NF)

$$N.F. = \frac{Q1 + Q2 + Q3 + M.}{4}$$

VIII.VII. BIBLIOGRAPHY

1. Materials Resistance Laboratory Guides.
2. ASTM Technical Standards, DIN, JIS.
3. MATERIALS MECHANICS. R.C. Hibbeler Editorial Image: Simon & Schuster Company. Third edition.