NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF ELECTRICAL AND ELECTRONICS ENGINEERING

TELECOMMUNICATIONS ENGINEERING PROGRAM

IT313 – LABORATORY OF TELECOMMUNICATIONS INSTRUMENTATION

I. GENERAL INFORMATION

CODE	**:**	IT313 – Laboratory of Telecommunications Instrumentation
SEMESTER	**:**	6
CREDITS	**:**	01
HOURS PER WEEK	**:**	03 (LABORATORY)
PREREQUISITES	**:**	EE411 – Electronic Devices
CONDITION	**:**	Mandatory

II. COURSE DESCRIPTION

This course is eminently practical, where the students learn the characteristics and how to use different measurement instruments used in telecommunications engineering.

III. COURSE OUTCOMES

At the end of the course the student will:

- Select correctly the equipment and instruments to be used according to the laboratory experience to be developed.
- Properly handle measuring and control instruments, configuring and connecting them correctly.
- Build analog circuits to verify their proper functioning with the measuring and control instruments.
- Tabulate the results in an orderly manner and make graphs and correctly interpret the results obtained, generalize and formulate conclusions.
- Compare the experimental results with the theoretical ones verifying the validity of the analog circuits built in the experiences.
- Prepare technical reports detailing the process developed, interpreting results and formulating conclusions.

IV. LEARNING UNITS

1. **REGISTRATION AND REPORT OF MEASUREMENTS**
2. **ASSESSMENT OF MEASUREMENT DATA**
3. **ANALOG AND DIGITAL METERS**
4. **SIGNAL GENERATORS**

5. **OSCILLOSCOPES**
6. **TIME MEASURING EQUIPMENT**
7. **SPECTRUM METERS**
8. **NOISE METERS**
9. **BIT ERROR RATE (BER) METERS**
10. **CROSSTALK METERS**

V. METHODOLOGY

The course takes place in laboratory sessions. In the sessions of the experiences, the professor presents the laboratory guide document. At the end of the laboratory, the student team must submit a technical report. In all sessions the active participation of the student is promoted.

VI. EVALUATION FORMULA

The learning will be evaluated through the "D" system:

- This course's final grade (FG) is calculated averaging the 06 highest laboratory grades.

$$FG = \frac{L1 + L2 + L3 + L4 + L5 + L6 + L7 + L8 - mins(L1\ to\ L8)}{6}$$

VII. BIBLIOGRAPHY

- "Course guide: Laboratory of Telecommunications Instrumentation", course professor.
- "Practical Data Communications for Instrumentation and Control", John Park, Steve Mackay. Newnes, 2003.
- "Principles of Electrical Measurement", Slawomir Tumanski. CRC Press, 2006.