



**NATIONAL UNIVERSITY OF ENGINEERING**  
**COLLEGE OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**ELECTRICAL ENGINEERING PROGRAM**

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**EE345 – ELECTRICAL INSTALLATION I**

**I. GENERAL INFORMATION**

<b>CODE</b>	: EE345 – Electrical Installation I
<b>SEMESTER</b>	: 8
<b>CREDITS</b>	: 04
<b>HOURS PER WEEK</b>	: 06 (Theory – Practice)
<b>PREREQUISITES</b>	: EE214 – Electrical Machines II EE241 – Laboratory of Electrical Machines I
<b>CONDITION</b>	: Mandatory

**II. COURSE DESCRIPTION**

It is a subject of a theoretical and practical nature and belongs to the area of professional training. Its purpose is to train the student in the elaboration of projects of interior electrical installations, at the execution level.

**III. COURSE OUTCOMES**

At the end of the course the student will:

- Identify, design and understand the functions of all the components of an electric circuit.
- Know the fundamentals of electrical installations (Planning, execution, architectonic description, etc.)
- Describe the types of installations and its differences in parameters and components for residential buildings, office buildings and industries.

**IV. LEARNING UNITS**

- 1. INTERIOR ELECTRICAL INSTALLATIONS IN LOW VOLTAGE.**  
Generalities. Objective. Reach. Legal norms and regulations. The electrical system
- 2. DESCRIPTION OF THE ELECTRICAL INSTALLATIONS PROJECT.**  
Basic information. Design principles. Scope of indoor electrical installations.
- 3. PLANNING AND EXECUTION OF THE ELECTRICAL INSTALLATIONS PROJECT.**  
Generalities. Definition. Parts. The electrical project. Zoning and electrical qualification. Presentation of the electrical project. Classification of electrical projects according to the National Construction Regulations.
- 4. DESCRIPTION OF THE ARCHITECTURAL PROJECT.**  
Generalities. Definition. Types of architectural projects. Classification of environments. Types of plans. Symbolology applied to architectural plans.

**5. RESIDENTIAL ELECTRICAL INSTALLATIONS PROJECT.**

Generalities. Study of the architectural project. Location of charges. Study and determination of installed load and maximum demand. Design of circuits, feeders and boards. Grounding system.

**6. ILLUMINATION.**

Generalities. Principles, magnitudes and lighting units. Fundamental Laws. Selection criteria for lamps and luminaires. Interior lighting design methods. Considerations of lighting levels with specific tasks.

**7. PROJECT OF ELECTRICAL INSTALLATIONS IN BUILDINGS.**

Generalities. Study of the architectural project. Location criteria of various loads. Location of communications outputs according to the requirements. Board location considerations. Location of the energy meter or meter bank. Study and determination of the installed load and maximum demand. Design of derivative circuits, feeders and boards. Use of uprights and their types. Grounding system.

**8. INDUSTRIAL ELECTRICAL INSTALLATIONS PROJECT.**

Generalities. Study of the architectural project. Location criteria of machines with their respective loads. Location of lighting outlets and outlets. Location of communications outputs according to needs. Considerations in the location of general boards and distribution. Location of energy meters. Study and determination of installed load and maximum demand. Design of derivative circuits, feeders and boards. Protection of electrical systems, grounding systems. Power factor reduction.

**9. METRADO AND BUDGET.**

Generalities. Norms and method for the measurement's execution. Analysis of unit costs, direct and indirect costs. Automatic adjustment polynomial formula. Indices of variation of costs.

**10. EMERGENCY SYSTEMS.**

Generalities. Definition, classification. Shipping, design criteria. Applications.

**V. METHODOLOGY**

The course takes place in theory and practice sessions. In the theory sessions the teacher presents the concepts, principles for the analysis of electrical installations. In the practical sessions, different problems and their various applications are presented and solved. In all classes the active participation of the student is promoted both in the analysis and in the solution of problems.

**VI. EVALUATION FORMULA**

The learning will be evaluated through the "G" system.

- Partial Exam (PE): Weight 1
- Final Exam (FE): Weight 2
- Average of Practices (P): Weight 1.

$$FA = \frac{PE + 2 * FE + P}{4}$$

## **VII. BIBLIOGRAPHY**

- “Electrical Installation Work”, Trevor Linsley. Routledge, 2019.
- “Electrical Installation Calculations”, A. J. Watkins, Christopher Kitcher. Routledge, 2006.
- “Handbook of Electrical Installation”, Geoffrey Stokes. John Wiley & Sons, 2008.