



**NATIONAL UNIVERSITY OF ENGINEERING**  
**COLLEGE OF GEOLOGICAL, MINING AND METALLURGICAL**  
**ENGINEERING**

**MINING ENGINEERING PROGRAM**

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**ME315 – ELECTRICAL ENGINEERING**

**I. GENERAL INFORMATION**

<b>CODE</b>	: ME315 Electrical Engineering
<b>SEMESTER</b>	: 4
<b>CREDITS</b>	: 3
<b>HOURS PER WEEK</b>	: 5 (Theory – Practice)
<b>PREREQUISITES</b>	: FI345 Physics III
<b>CONDITION</b>	: Compulsory

**II. COURSE DESCRIPTION**

The course aims to provide students with basics of electricity for the design of indoor and outdoor electrical wiring in buildings, industrial and mining plants. It encompasses direct current circuits, single-phase and three-phase alternating current circuits, building, industrial and mining wiring, primary and secondary electrical networks, lighting, electrical sub-stations, vertical transport, diesel generator, electric power station.

**III. COURSE OUTCOMES**

1. Learn electric power applications in buildings and industrial facilities. Analyze and calculate direct current circuits.
2. Analyze and calculate single-phase and three-phase alternating current circuits.
3. Design indoor electrical wiring for housing and buildings.
4. Apply current design rules and regulations.
5. Identify and learn the application of several types of light fixtures.
6. Identify several types of electrical substation.
7. Select diesel generators for power supply in works as emergency diesel generator.
8. Learn electric power station operation principles.

**IV. LEARNING UNITS**

**1. IMPORTANCE OF THE ELECTRICITY / 5 HOURS**

Importance of the electricity. Generation, transmission and distribution / National Interconnected System / Electricity charges / Peruvian energy situation.

**2. DIRECT CURRENT CIRCUITS / 10 HOURS**

Fixed and variable circuit parameters / Ohm's law / Kirchhoff's laws / Series and parallel circuits / Direct current circuits' analysis / Solution to application problems.

**3. SINGLE-PHASE, THREE-PHASE AND ALTERNATING CURRENT CIRCUITS / 12 HOURS**

Alternating current single-phase circuits / Active power, apparent power, idle power and power factor / Star connection and delta connection / Three-phase circuit power / Examples, application problems.

#### **4. HOME ELECTRICAL WIRING / 15 HOURS**

Primary and secondary electrical networks, aerial and underground wiring / Electrical transformation substation in buildings, schemes of principle, building sizing, equipment disposal / Loads and people vertical transportation, main components, basic sizing. Operation condition, civil works.

#### **5. ELECTRIC POWER GENERATION / 10 HOURS**

Diesel generators, types, premise sizing. Equipment assembly. Ventilation. Equipment disposal / Hydroelectric power station. Types of turbines. Equipment disposal. Design conditions. Civil works / Thermal power station, steam turbines, gas turbine. Equipment disposal. Civil works.

### **V. METHODOLOGY**

This course is carried out in theoretical and practical sessions. In theoretical sessions, the instructor introduces concepts, theorems and applications, complementing with available audiovisual aids and encouraging the active participation of the students. In practical sessions, problems are solved and their solutions are analyzed with the participation of the students, likewise students are given individual homework.

### **VI. EVALUATION FORMULA**

The average grade PF is calculated as follows:

$$PF = 0.3 EP + 0.3 EF + 0.2 PP + 0.2 TE$$

EP: Mid-Term Exam

EF: Final Exam

PP: Average of three quizzes

TE: Average of two design projects

### **VII. BIBLIOGRAPHY**

- 1. NATIONAL ELECTRICITY CODE VOLUME I, IV, V.**  
National Direction of Electricity. Energy and Mining Department, 2016
- 2. RICHART C, DORF**  
Electric circuits, Introduction to Analysis and Design  
Alfa Omega Editorial, 2015
- 3. KERCHNER AND CORCORAN**  
Alternating Current Circuits  
CESCA Editorial, 2006