

# **EEE511 Electrical Power Systems (3 Units)**

**Department of Electrical and Information Engineering**

**Covenant University**

# 1. EEE511

## 1.1. EEE511 Electrical Power Systems (3 Units)

Basic Concepts: Review of basic concepts of three-phase power and reactive power flow. Single line and reactance diagram of power systems. Per-unit representation. An overview of power system.

Load Flow Analysis: Representation of power system. Bus admittance matrix. Power flow equations. Power-flow solutions by Gauss-Seidel and Newton-Raphson methods, Sparsity Techniques, Decoupled and fast decoupled methods.

Symmetrical and Unsymmetrical Faults: Transients in series R-L circuit. Internal voltages of loaded machines under fault conditions. Symmetrical fault analysis, Z-bus and fault analysis using Z-bus. Symmetrical components, Sequence networks. Unsymmetrical faults: single line-to-ground fault, line-to-line fault and double line-to-ground fault. Stability studies. Principles of power system protections.

Deregulated Power Systems: Historical Development, Technical, economic, and regulatory issues; Challenges in decentralized control of power systems, Optimal power flow tools applied to deregulated electric power industry, transaction management system (TMS, Congestion management, Nigerian Power Systems and Deregulation.