OPUS College of Engineering
MARQUETTE UNIVERSITY

# PRINCIPLES OF POWER SYSTEM PROTECTION AND MONITORING

**ELEN 4240/ EECE 5240 Fall-2022**

image courtesy: https://www.britannica.com/technology/telecommunication

## Why do we need to learn power systems protection and monitoring?

**Power system protection and fault monitoring is a critical part of the overall power system health. In the modern power system, with its emphasis of the self-healing capabilities of the Smart Grid, the art of protective relaying schemes for power system apparatus and the integrated power system is critical to the operation of the power system.**

**The nature of power system protection and monitoring is a combination of technical knowledge of each unique system and practical know how that are learned through experience. This class will provide the technical knowledge and calculation tools necessary to approach the art of power system protection to ease the learning curve of the student as they gain the necessary experience in the future.**

**The class will also give the student a taste of the complexities and the tight interactivity of the power system as they impact the power system protection goal.**

**Pre-requisites for EECE5240: Fundamental understanding of electric machines, transformers, and electrical energy system is recommended.**

**Prerequisites for ELEN4240: ELEN 2020, ELEN 3110 and ELEN 3210.**

**Instructor: Dr. Peter Wung, EECE, Marquette University**

## WHAT YOU WILL LEARN IN THIS COURSE

- ✓ Review of Phasor Notation, Complex Power, and Three Phase Circuits
- ✓ The Nature and Philosophy of Power System Protection
- ✓ Symmetrical Component Analysis Method and Its Application
- ✓ Fault Classification and Balanced Fault Analysis
- ✓ Unbalanced Fault Analysis
- ✓ Instrument Transformers and Their Application in Power Systems
- ✓ Relays and Circuit Breakers for Power System Protection
- ✓ Principles of Design for Power System Protection Schemes and Fault Detection for
  - Power Apparatus Generators, Motors, Transformers, Bus bars, Loads
  - Transmission Lines and Networks
- ✓ Integrated Power System Protection and Detection-Protection Coordination