UNIVERSITY of NICOSIA

Course Code	Course Title	ECTS Credits
ECE-468	Power System Protection	6
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	ECE-360, ECE-362
Type of Course	**Field**	**Language of Instruction**
Elective	Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	4th	Dr Andreas Michaelides
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

Malfunction of the electric power system through fault currents, overheating of machines etc. may lead apart from operational disruption to severe damages of the power devices as generators, transformers, transmission lines etc. The present course hence, introduces basic monitoring schemes of the power devices and various relaying techniques supported by digital analysis to protect the power system. The course elaborates on the selective protection of generators, motors, transmission lines, capacitors, reactors, and buses.

Learning Outcomes:

After completion of the course students are expected to:

1. Assess general protection measurements of devices and controls for the various components constituting the power system.
2. Differentiate among main types of generator protection as phase/ground fault stator protection, open/shorted field winding protection, over speeding and overheating protection.
3. Determine appropriate methods for transformer protection in the event of fault/short current, heat dissipation and magnetizing current.
4. Apply basic principles of transmission protection in the power system as for the ground and over fault currents.
5. Classify main types of relay logics as hybrid/electromechanical/analogue/digital relay principles and the different criteria for their application.
6. Evaluate the characteristics of protective devices as fuse and relay characteristics.
7. Analyze the functional condition and the protection adequacy of the devices in a power system.

Course Contents:

1. Fundamental Units
2. Phasors and Polarity
3. Symmetric Components

4. Relay Input Sources
5. Protection Fundamentals and Basic Design Principles
6. System-Grounding Principles
7. Generator Protection/Intertie Protection for Distributed Generation
8. Transformer, Reactor, and Shunt Capacitor Protection
9. Bus Protection
10. Motor Protection
11. Line Protection
12. Pilot Protection
13. Stability, Reclosing, Load Shedding, and Trip Circuit Design
14. Microprocessor Applications and Substation Automation 10. Motor Protection
11. Line Protection
12. Pilot Protection
13. Stability, Reclosing, Load Shedding, and Trip Circuit Design
14. Microprocessor Applications and Substation Automation

Learning Activities and Teaching Methods:

Lectures accompanied by a functioning Protective Relay Model System in class.

Assessment Methods:

Homework, project, mid-term exam, final exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
J. Lewis Blackburn, Thomas J. Domin	Protective Relaying: Principles and Applications	CRC Press	2006	9781574447163

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Paul M. Anderson	Power System Protection	Wiley-IEEE Press	1998	9780780334274
T.S.M. Rao	Power System Protection Static Relays	McGraw Hill	2001	9780074603079