COURSE	Name	: Power Quality Conditioning
	Code	: EE185612
	Credit(s)	: 2
	Semester	: (Elective Course)

Description of Course

This course discusses about PHENOMENA and MITIGATION, as well as the simulation of the quality of electric power in electric power distribution system, by discussing: Definition of Power Quality, Standards, Capacitor Bank for Power Factor Correction, Reactive Power Flow and power system losses, Voltage Quality, Voltage Unbalance, Power System Harmonics and Mitigation.

Learning Outcomes

Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

Specific Skill

(KK02) Being able to compose problem solving in engineering through depth and breadth of knowledge which adapts to changes in science and technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

(S12) Working together to be able to make the most of his/her potential.

Course Learning Outcomes

Knowledge

Mastering the concept of PHENOMENA and MITIGATION electric power quality in power distribution system ac 3 phase in state of steady state / transient and symmetry / not symmetry.

Specific Skill

Able to simulate PHENOMENA and MITIGATION electric power quality in 3 phase ac power distribution system in steady state / transient and symmetry / no symmetry using simulation software.

General Skill

Able to use simulation software to simulate PHENOMENA and MITIGATION power quality in power distribution system.

Attitude

Demonstrate a responsible attitude towards the work in the field of electrical power expertise independently.

Working together to be able to take full advantage of their potential.

Main Subjects

1. Understanding PHENOMENA and MITIGATION electric power quality, problems due to decreased power quality
2. POWER QUALITY & STANDARD QUALITY DEFINITION: Transients, Short Duration Variations, Long Duration Variations, Voltage Imbalance, Waveform Distortions, Voltage Fluctuations, Power Frequency Variations
3. CAPACITOR BANK FOR CORRECTION OF POWER FACTOR: Definition of Power Factor, Reactive Energy Source, Technical and Economic Benefit, Capacitor Power Capacity of Bank, Example of Benefit of Power Factor Improvement
4. REACTIVE POWER REQUIREMENTS AND POWER RESPONSES: Reactive Power Flow, Reactive Power Absorbent Equipment / Costs, Reactive Power Rejection Rewards, Reactive Power Compensation, Capacitor Location, Reactive Power Compensation Side Effects.
5. VOLTAGE QUALITY: Understanding Voltage Disturbances, Transients, Short Duration Variations, Long Duration Variations, Voltage Fluctuation (Flicker).
6. IMPLICATIONS: Definition of Imbalance, Cause of Imbalance, Components of Symmetry, Indicators of Imbalance, Impact of Inequalities on Electrical Equipment, Practical Recommendations for Restricting Equilibrium, Improving Supply Chain Equilibrium.
7. Harmonics: Harmonic Causes, Harmonic Problems, How to Reduce Harmonics, How to Detect Harmonics, Voltage Harmonics and Current on Supply System, Harmonic Distortion Factors of Voltage and Current, Harmonic Flow Source, Characteristic Response System, Effects of Harmonics, Capacitors and Harmonics, Reduction of Flow Harmonics, Standard Harmonics.

Reference(s)

[1] W. Mielcczarski, G.J. Anders, M.F. Conlon, W.B. Lawrence, H. Khalsa, G. Michalik, ”Quality of Electricity Supply & Management of Network Losses”, Puma Press, 1997
[2] Roger C. Dugan, Mark F.McGranagan, H. Wayne Beaty, ”Electrical Power Systems Quality”, McGraw Hill, 1996
[3] Wilson E. Kazibwe, Musoke H. Sendaula, ”Electric Power Quality Control Techniques”, Van Nostrand Reinhold, 1993

Prerequisite(s)

Power System Analysis