

Faculty of Engineering & Technology

Power Quality

Information :

Course Code : EPR 533

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Specialization of Electrical Power Engineering

Instructor Information :

Title	Name	Office hours
Professor	Almoataz Youssef Abdelaziz Mohamed Abdelmaguied	8
Assistant Lecturer	Ahmed Moreab Hussien Mohamed	2

Area Of Study :

- Develop students understanding about the fundamentals of power quality.
- Help students identify the main terminology and standards of power quality.
- Train the students to apply different techniques of solving power quality problems.
- Help the students to recognize the measuring devices and methods for the power quality problems.

Description :

Power Quality Fundamentals: Definition, Terminology, Criteria, Standards. Voltage Sags: Characteristics, Mitigation, Voltage Fluctuations and Lamp Flicker. Power Frequency Disturbance: Disturbances, Low Frequency Disturbances, Voltage Tolerance Criteria - ITIC Graph. Electrical Transients: Modeling, Types and Causes. Harmonics: Voltage and Current Harmonics, Individual and Total Harmonic Distortion. Power Factor: Power Factor Improvement, Advantages of Power Factor Correction. Measuring and Solving Power Quality Problems: Measurement Devices.

Course outcomes :

a. Knowledge and Understanding: :

1 -	Recognize the concepts and basic principles of power quality
2 -	Identify various solutions for different power quality problems, especially harmonics and power factor correction
3 -	Describe techniques for computer modeling, simulation, rendering and presentation of power quality items
4 -	Identify the requirements related to voltage levels and its related quality

b. Intellectual Skills: :

1 -	Express power quality problems using mathematical formulation
2 -	Apply different solutions for grounding and bonding methods
3 -	Decide the choice among different solution alternatives for power factor enhancement.
4 -	Evaluate obtained results of using power quality devices such as harmonic filters.

c. Professional and Practical Skills: :

- 1 - Prepare and present technical reports on different power quality problems in the industry.

d. General and Transferable Skills: :

- 1 - Effectively manage tasks, time, and resources.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction	5	3	2
Power Quality Fundamentals: Terms and Definitions	15	9	6
Voltage Sags and Interruptions	10	6	4
Electrical Transients	11	6	5
Voltage Regulation	10	6	4
Power Factor Improvement	10	6	4
Harmonics	14	9	5

Teaching And Learning Methodologies :

- Interactive Lecture
- Discussion
- Problem-based learning
- Report

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final exam	40.00		to assess the performance of students during the course
o Assignments	10.00		
o Mid-Term exams	30.00		
o Quizzes	10.00		
o Reports	10.00		

Course Notes :

No course notes are required

Recommended books :

- R. C. Dugan, M. F. McGranaghan, S. Santoso and H. W. Beaty, Electrical Power Systems Quality 3rd Edition, McGraw Hill, 2012.
- 8.2 Recommended Books
- 1- Bhim Singh, Ambrish Chandra, Kamal Al-Haddad, Power Quality: Problems and Mitigation Techniques-Wiley; 2015.
 - 2- C. Sankaran, Power Quality-CRC Press, 2002.
 - 3- Alexander Kusko and Marc T. Thompson, Power Quality in Electrical Systems-McGraw Hill, 2007.

