FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

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 :

ÅUnderstand the fundamentals of power quality.
ÅKnow the main terminology and standards of power quality.
ÅApply different techniques of solving power quality problems.
ÅKnow 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. Grounding and Bonding: NEC Requirements, Earth Resistance Tests, Earth Ground Grid Systems, Power Ground System. Power Factor: Power Factor Improvement, Synchronous Condensers, Static Var Compensators, Advantages of Power Factor Correction. Electromagnetic Interference; Electrical and Magnetic Fields, Power Frequency Fields, High Frequency Interference, EMI Terminology. Measuring and Solving Power Quality Problems: Measurement Devices, Test Locations, and Duration.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a1- Summarize the concepts and basic principles of power quality.
2 -	a2- Describe solutions for different power quality problems, especially harmonic nature and power factor corrections, in various ways: verbally, graphically, and using simulation.
3 -	a3- Describes computer modeling, simulation, rendering and presentation of power quality items techniques.
4 -	a4- Explain the customer needs and requirements such as those regarding voltage levels and its related quality.
b.Intellectual Skills: :	
1 -	b1- Express power quality ideas in structural and mathematic terms so that quantities evaluation is facilitated.
2 -	b2- Apply different alternative solutions for grounding and bonding methods.
3 -	b3- Decide the choice among different solution alternatives for power factor enhancement.
4 -	b4- Evaluate obtained results of using power quality devices such as harmonic filters.

c.Professional and Practical Skills: :	
1 -	Ability to integrate knowledge and understanding of mathematics, information technology, design and engineering concepts to design and plan electrical systems to solve problems.
2 -	Conduct research and collect data from different resources.
3 -	Use appropriate techniques for representation.
d.General and Transferable Skills: :	
1 -	d1- Write reports in accordance with standard scientific guidelines.
2 -	d2- Work in a self-directed manner.
3 -	d3- Work coherently and successfully as a part of a team.
4 -	d4- Carry out solutions for problems using innovative thinking.

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
Small Group Discussion
Public Group Discussion

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
ÅFinal exam	40.00		to assess the performance of students during the course
o Mid-Term exams	30.00		
o Quizzes, class participation, reports, and Assignments	30.00		

Course Notes :

No course notes are required

Recommended books :

1- R. C. Dugan, M. F. McGranaghan, S. Santoso and H. W. Beaty, "Electrical Power Systems Quality", 3rd Edition, McGraw Hill, 2012.
2- C. Sankaran, "Power Quality", CRC Press, 2002.
3- Alexander Kusko and Marc T. Thompson, "Power Quality in Electrical Systems", McGraw Hill, 2007.