



SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE
www.sathyabama.ac.in**

Department of Electrical and Electronics

New course introduced

SL. NO.	COURSE CODE	COURSE OFFERED
1	SEE1612	Electrical Power Quality

SEE1612	ELECTRICAL POWER QUALITY	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To impart knowledge on sources and characteristics of power quality.
- To study the measurement and analysis of power quality indices.
- To understand the various power quality improvement techniques.
- To get acquainted with the high power applications.

UNIT I CHARACTERISATION OF ELECTRIC POWER QUALITY 9 Hrs.

Introduction – Characterisation of Electric Power Quality: Transients, short duration and long duration voltage variations, Voltage imbalance, waveform distortion, Voltage fluctuations, Power frequency variation, Power acceptability curves – General power quality problems: poor load power factor, Nonlinear and unbalanced loads, DC offset in loads, Notching in load voltage, Disturbance in supply voltage.

UNIT II SOURCE OF POWER QUALITY PROBLEMS 9 Hrs.

Static power converter-DC/AC pulse width modulated drives-Switched mode power supplies-AC voltage regulators-Cycloconverter-Arc furnaces-Static VAR compensator-Inverters for Dispersed generation-Electronic phase control.

UNIT III MEASUREMENT OF POWER QUALITY INDICES 9 Hrs.

Measurement-General, Basic Equipment used for the analysis of non-sinusoidal voltages and currents, requirements of instrument response, Presentation of harmonic data, Transducers for harmonic measurements, Distortion factor, Crest factor.

UNIT IV ANALYSIS OF POWER QUALITY INDICES 9 Hrs.

Analysis methods-Harmonic current calculation, System frequency response calculations, Modelling Guide lines for Harmonic Analysis, Telephonic Interference, Line notching Calculations, Total Harmonic distortion, Displacement power factor improvement calculation.

UNIT V POWER QUALITY IMPROVEMENT TECHNIQUES 9 Hrs.

Power factor corrector-Harmonic filter-passive, Active and Hybrid filters –Static compensator-Distribution static compensator-Dynamic voltage restorer- Protecting sensitive loads using DVR - Use of PWM techniques in power quality improvement.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand the characterization of electric power quality.
- CO2 - Evaluate the various source of power quality problems.
- CO3 - Analyze different types of power quality indices.
- CO4 - Design various methods for power quality measurements.
- CO5 - Apply and analyze the various power quality improvement techniques.
- CO6 - Implement power quality methods in high power applications.

REFERENCES

1. Arindam Ghosh "Power Quality Enhancement Using Custom Power Devices", Kluwer Academics Publishers, 2002
2. G.T Heydt, "Electric Power Quality", Stars in Circle Publications, 1994, (2nd Edition).
3. J.Arilliga, N.R.Watson and S.Chen, "Power System QualityAssessment", John wiley& Sons,England, 2000.
4. Robert W. Erickson &Dragon Maksimovic, "Fundamentals of Powerelectronics" second edition, 2001 spring and Business media.
5. IEEE Recommended practices and requirements for Harmonic control in Electrical power systems, IEEE Std. 519-1992.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 10 Question of 2 marks each – No choice

20 Marks

PART B: 2 Questions from each unit of internal choice; each carrying 16 marks

80 Marks