

**EE 552      Distributed Generation and Power Quality**

**COURSE INFORMATION**

Prerequisites	Academic Year &Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Lab.	
EE 423	5	9 \10	2	2		3

**COURSE AIM**

- Introduce students to the concepts of distributed generation, distributed storage, and microgrid.
- Recognize the different power quality events and their causes, characterization, and remedy.
- Enrich the student knowledge with the basic concepts of power quality and its related standards.
- Introduce the basic principles of series and shunt compensation for power networks.
- Train the student to design power filters .

**COURSE WEEKLY CONTENTS**

- 1 Introduction to Energy Network Interfacing
- 2 Distributed generation, distributed storage, and microgrid
- 3 Static Synchronous Generator
- 4 Impacts of Distributed generation on electrical grids
- 5 Power quality standards, definitions, and characterizations.
- 6 Fundamentals of Harmonics: Causes, indices, system response characteristics, and effects on different components.
- 7 Midterm Exam
- 8 Devices for Controlling Harmonic Distortion and Notch filter design
- 9 Analysis of electric Power Quality: Unbalance, Voltage Sag, Swell, and Flicker
- 10 Instantaneous real and imaginary power theory
- 11 Shunt and series compensation of various power quality events.
- 12 Unified power quality conditioner + 12th week assessment
- 13 Hybrid filters
- 14 Power quality monitoring
- 15 Wiring and Grounding

**STUDENT GRADING & ASSESSMENT**

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	20 Midterm	←	1 0	M A R K S		→	30
To be freely distributed among possible assessments							
8 to 12	←		2 0	M A R K S		→	20
13 to 15	←		1 0	M A R K S		→	10
16 or 17	40 Final						40
<b>Total</b>	<b>Exams</b>	<b>Assign.</b>	<b>Quizzes</b>	<b>Reports</b>	<b>Present.</b>	<b>Lab.</b>	100

## REFERENCES

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|----------|---|
| Textbook | R.C. Dogan, M.F. McGranaghan, S. Santoso, and H.W. Beaty "Electrical Power Systems Quality," McGraw-Hill, 2nd edition, 2003 |
| Other    | A. Ghosh and G. Ledwich, "Power Quality Enhancement Using Custom Power Devices," Klumer Academic Publishers, USA, 2002.     |