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Electric Energy: An Introduction, Third Edition (Power Electronics and Applications Series)

By Mohamed A. El-Sharkawi



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Electric Energy: An Introduction, Third Edition (Power Electronics and Applications Series) By Mohamed A. El-Sharkawi

The search for renewable energy and smart grids, the societal impact of blackouts, and the environmental impact of generating electricity, along with the new ABET criteria, continue to drive a renewed interest in electric energy as a core subject. Keeping pace with these changes, **Electric Energy: An Introduction, Third Edition** restructures the traditional introductory electric energy course to better meet the needs of electrical and mechanical engineering students.

Now in color, this third edition of a bestselling textbook gives students a wider view of electric energy, without sacrificing depth. Coverage includes energy resources, renewable energy, power plants and their environmental impacts, electric safety, power quality, power market, blackouts, and future power systems. The book also makes the traditional topics of electromechanical conversion, transformers, power electronics, and three-phase systems more relevant to students. Throughout, it emphasizes issues that engineers encounter in their daily work, with numerous examples drawn from real systems and real data.

What's New in This Edition

- Color illustrations
- Substation and distribution equipment
- Updated data on energy resources
- Expanded coverage of power plants
- Expanded material on renewable energy
- Expanded material on electric safety
- Three-phase system and pulse width modulation for DC/AC converters
- Induction generator
- More information on smart grids
- Additional problems and solutions

Combining the fundamentals of traditional energy conversion with contemporary topics in electric energy, this accessible textbook gives students the broad background they need to meet future challenges.

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Editorial Review

Review

"El-Sharkawi's book is an excellent introduction to electric power. ... This very well-written book describes the hardware used in electrical power generation and transmission. Particularly valuable are the color pictures showing power plants, transmission lines and other hardware. The operation principles of the system are also clearly described in the book, without complicated unnecessary details. These explanations give an appropriate picture of the power system operation for incoming students. ... Particularly important are the clear discussion of renewable energy generation and the explanation of emerging generation techniques like fuel cells. The book presents well-prepared, practical numerical examples, which enforce students' ability to solve engineering problems."

?George G. Karady, Arizona State University, Tempe, USA

"This is a great piece of work. It combines a diverse set of materials creatively in a single text. Excellent!"

?Peter Idowu, Penn State Harrisburg, Middletown, USA

"The strength of this book is in its broad treatment of electric energy components and systems in a way that is both useful to engineering students as a stand-alone course, and provides background for more advanced study in these topics."

?Paul Hines, The University of Vermont, Burlington, USA

Praise for the Second Edition

"I found the book to be a nice introductory course to the discipline of electric energy production, transmission, and distribution. I would recommend it to the undergraduate student beginning to explore the rewarding career path of electrical engineering, and equally so to nontechnical professionals working in the power and energy industry who may wish to gain greater insight into the functioning and operations of the electric power system. I truly enjoyed reading this book."

?Pouyan Pourbeik, *IEEE Power & Energy Magazine*

About the Author

Mohamed A. El-Sharkawi is a fellow of the IEEE and a professor of electrical engineering in the energy area at the University of Washington. He has published more than 250 papers and holds five licensed patents in the area of renewable energy VAR management and minimum arc sequential circuit breaker switching. For more information, please visit Professor El-Sharkawi's website at the University of Washington.

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